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ABSTRACT

This bicentennial volume offers a blend of Arkansas history, ecology, and literature. Its purpose is to show the relationship between Arkansas' people and their land. It contains a discussion of the Natural Divisions concept, the geological development of the state, and descriptions by early pioneers. The volume is not intended to be a complete history of Arkansas. It does include history, but from a different point of view - that of environmental systems, past and present. It is meant for use by teachers as a resource book and as a textbook in secondary school and college classes. A number of maps and diagrams are included in the appendices. (RH)

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Preface

This environmental volume offers a blend of Arkansas history, ecology, and literature. Its purpose is to show the relationship between Arkansas' people and their land. It contains a discussion of the Natural Divisions concept developed by Dan Foti, the geological development of our state, and selected descriptions by the early pioneers of Arkansas.

This volume is not intended to be a complete history of Arkansas. It does include history but from a different point of view - that of environmental systems, past and present. It is meant for use by all teachers as a resource book, for high school and college students as a textbook in Science, Social Studies and English courses, and for others interested in Arkansas history and land use.

It is suggested that schools, who want to use this book, may find it helpful to obtain maps from the Soil Conservation Service and the Arkansas Geological Commission, to take local field trips and to use the other Arkansas history books to supplement this book. Consultant services are available from the Department of Education in the use of the book.

The rest of this series will cover early settlements, natural resources, economics, culture, and land use potentials and problems. An important feature of this series is the blend of many disciplines of study into a more complete picture of Arkansas. The series puts together much that what we in education tend to separate. (Science, Social Studies, Language Arts, etc.)

William L. Fulton
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Some of this material has appeared before in the Arkansas Natural Areas Plan, and its use here is gratefully acknowledged.

ARKANSAS: ITS LAND AND PEOPLE

BY TOM FOTI

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Pinnacle Mountain

AN OVERVIEW OF THE NATURAL DIVISIONS

The central viewpoint of this look at Arkansas is that history develops in relation to land. When people arrived in the territory that was to become Arkansas, they found mountains, prairies and lowlands. As they fitted their uses of the land to the unique characteristics of the natural environments in which they found themselves, their own lifestyles changed, sometimes dramatically.

The richness of the state's history is partly due to the diversity of its landscape. Both of these are part of Arkansas' heritage, and so it is appropriate in thinking about Arkansas to consider the special characteristics of its varied regions, the uses to which those regions have been put, and the history that has developed within each of them. This regional viewpoint also provides a better understanding of the problems that have developed in relation to man's use of the land in Arkansas, the problems which may develop in the future, and the relationships between those problems and the potentials which Arkansas offers for social and economic development.

There are six major natural geographic divisions of Arkansas. They are the Ozark Mountains, the Ouachita Mountains, the Arkansas River Valley, the Coastal Plain, the Delta, and Crowley's Ridge. (See Appendix)

The Ozark Mountain division occupies the northwestern corner of the state. The flat-topped mountains there are the remnants of eroded plateaus whose horizontal layers of ancient sedimentary rock were forced upward millions of years ago. They are covered with an upland forest of oak and hickory. Settlers eked out a bare living from farms in some of the wider valleys and on the level hilltops, and in the process, they developed a unique mountaineer lifestyle. Cash crop agriculture was seldom practical in the rocky soils of the Ozarks, and most of the residents of the mountains moved away when their subsistence economy became unnacceptable. The Ozarks are currently experiencing a recreational-retirement boom which is bringing people back, this time to enjoy perhaps the greatest resource of the Ozarks region, its beauty. But the new residents bring with them new problems. Problems created by the demands they place on the limited water supplies of these headwaters, streams, and the pressures their sewage places on the life systems of those streams.

The Ouachita Mountain division, south of the Ozarks, is characterized by long, narrow ridges of folded rock. Many of the valleys between the ridges are large enough and fertile enough for large-scale agriculture, and the mountains themselves with their fast-growing forests of oak and pine are capable of supporting a thriving timber industry. Therefore, the subsistence farmsteads and the isolation that were so important in developing the Ozarks culture were never as prevalent in the Ouachitas. The culture which did develop was a varied blend of upland and lowland, poor mountaineer, and rich planter. The uses to which man puts the Ouachitas today include agriculture, forestry, and, because of the tremendous forces involved in the creation of these mountains, mining. Each of these uses presents potential problems and each must be carefully done in order to protect the natural system which make them possible.

The Arkansas River Valley division, lying between the two major mountain systems and long the river which was an important early path of communications, developed quickly as a focus for settlement in the territory. Little Rock, Cadron, and Ft. Smith sprang up in it. Cash-crop agriculture soon became important in the valley and has remained so since. Because the valley possesses

scenic quality, abundant water, fertile land, and good transportation, it has become and will remain one of the major centers of population growth and industrial development in Arkansas. The problems encountered there are those which spring from an abundance of people and progress, problems like air and water pollution, and the turning of every one of its scenic, free-flowing rivers into a water supply reservoir.

The Coastal Plain division, in southern Arkansas, is an area of rolling, pine-covered hills, which today produces most of the state's forest products. The earliest settlements of Arkansas were in this region, in the broad bottomlands along the Red River. Men cleared the forest there for cotton plantations and lived in the grand southern style. The pine forest of the rolling hill-land provided a valuable resource to the northern timber industry. After the timber was cut, much of this land was occupied by small farms, but today most of the farms have been abandoned and most of the people have left or moved to the towns which are sustained by the timber industry. Their farms were bought by the timber companies who realized that the highest use of this land was growing trees, and the Coastal Plain is again almost uninterrupted forest. In the future, the people of the Coastal Plain must deal with such controversial issues as clear cutting, herbicides and other tools of modern intensive forest management. They must also deal with the problems associated with mineral production from their land, particularly petroleum, baxuite, and that new giant, lignite.

The Delta division, occupying the eastern third of the state, is a land created by rivers. The ocean-bottom sands and gravels of the Coastal Plain have here been swept away and in their place sand, silt and clay carried by the rivers have been deposited. A majestic bottomland hardwood forest once covered the land, except for a high terrace occupied by the tall grasses and flowers of the Grand Prairie. Settlers found the Delta a harsh, inhospitable land with its floods, mosquitos and malaria. But the deep soil made it tremendously fertile, and so men set out to conquer it, first with the labor of slaves, and eventually with that of huge machines. The antebellum culture was at the same time romantic and corrupt, a refined culture dependent upon the enslavement of both people and land. Though the men have been freed the land remains conquered. Hardly a natural stream or a bit of the once majestic forest remains. The people of the Delta must determine whether the remaining ten percent of the bottomland forest is to be preserved, whether at least a few streams are to remain unditched and clear, or whether all this is to be sacrificed to the ever expanding demand for food and fiber.

The Crowley's Ridge division is the exception to the character of eastern Arkansas. It is a two to three hundred foot high ridge made of the dust (loess) deposited by ancient winds. It does not flood and is covered with an upland forest of a type more similar to that of Tennessee than to the forest of the rest of Arkansas. Because of its elevation, the ridge was the site of way-stations on the first road from Memphis to Batesville and Little Rock. Later, many of the towns which derived their income from the lowlands of the Delta were located on the ridge to avoid floods. They include Jonesboro, Forrest City and Helena. A unique characteristic of the dust which creates the ridge is its susceptibility to erosion. Any of man's activities there must "tread with light feet" in order to avoid massive destruction of the delicate soil.

These are the major natural divisions of our state. Each division represents a unified system whose representative components are geology, topography, climate, soil, plants and animals. Man, through the use of the land, also functions as a part of these systems. By observing how man relates to the land, we can get new insight to our Arkansas Heritage.

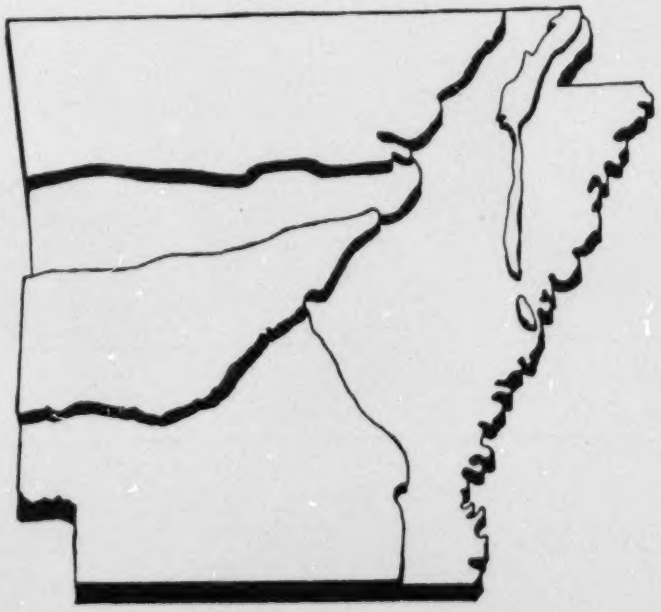
At this point it is useful to look at some of the basic ideas behind the natural divisions concept.

The natural divisions concept has three major objectives: to give insight into what an environment or ecosystem is; to graphically show how man is a part of the environment; and to provide students with an understanding of the principles behind land-use practices which will enable them to choose among alternative solutions to land-use problems.

The foundation for the natural divisions approach is scientifically correct; it is, indeed, a presentation of the ecosystem concept. Ecosystems may be dealt with at any level from that of the minute life in a drop of water to the level of the whole earth (the biosphere). The natural divisions approach, as used here, has as its basic units those natural systems which are of significant size in relation to the size of the total area being investigated. In this case, the systems were chosen to be significant in relation to Arkansas. In a study of North America, on the other hand, some of the divisions of significance to Arkansas would be consolidated.

The first step in understanding the natural divisions concept is to understand natural systems. A natural system is composed of many things, but for purposes of teaching it is simplified so that the components considered are geology, topography, climate, vegetation, soils, man's use of the land, man's history and culture in the region and potential land-use problems. Scientifically, these are related in the following way: geology and topography develop more or less together from forces within the earth, those two components interact with climate to provide suitable habitat for certain vegetation, the vegetation interacts with geology, topography and climate to form soil. Animals occupy suitable habitat provided primarily by the existing vegetation. Man enters this system and functions as a part of it in that his use of the land is limited by the potentials inherent in the system (e.g., he can't farm on steep slopes). The use to which he puts the land shapes his own lifestyle and consequently colors his history. Finally, the ways his use of the land changes the natural system dictate the kind of land-use problems which may develop in the area.

A natural division is a region which is occupied by one major natural system. The natural systems of any two natural divisions are different.



HOW ARKANSAS GOT TO BE

This story of Arkansas doesn't have a beginning, only a starting place. The story began on the first day of creation, but at this starting place. The continents had begun to be formed and started their drifting. Arkansas was soon to be but was then covered by the sea. The time was the paleozoic, in greek, the time of "ancient life." (See Geo. History in Appendix)

At the beginning of the paleozoic, 500 million years ago, Arkansas was completely inundated by the sea, but there were islands nearby. Up in what is now east-central Missouri, there were the St. Francis Mountains, masses of granite which had been formed almost half a billion years before and were destined to continue to exist as a reconizable mountain range even to the present. They would also become the structural center of the Ozark Mountains.

To the south of the Arkansas sea there was another land mass, called "Llanoria" by some geologists, a lofty mountain range which was fated to erode away completely. The sediments of Llanoria would eventually form the rock of which the Ouachita Mountains are composed.

Under the waters of southern Arkansas lay a deep basin, the Ouachita embayment where 30,000 feet of sediments from Llanoria accumulated.

The Arkansas sea itself varied in character. To the south the rivers of Llanoria were bringing in sediments at such a great rate that the waters were continually cloudy with sand or mud so few living things existed in them. The sands of Llanoria accumulated to such great thickness in the Ouachita Basin that their tremendous weight compressed them into the sandstones typical of the Ouachitas today. Muds were compressed into shale, and the rocks were ready to be formed into mountains.

To the north, just south of the St. Francis Mountains, the sea was very different in character. The waters there were shallow and quiet and the water was as warm as the water around today's Bahamas. Those waters teemed with life, mostly tiny plants and animals, but also sponges, corals, and clam-like brachiopods. When those animals died, their skeltons (even the shells of the one-celled animals) dropped to the bottom, where they accumulated to great thickness and were compressed into limestone and dolomite. Occasionally a complete shell would be preserved and the abundance of those remains makes the Ozarks today one of the most productive fossil-producing areas in the country. The muddy waters of the Ouachitas Embayment, on the other hand, did not provide good habitat for creatures which could become fossils, and so fossils are relatively rare there.

This quiet period of accumulation and consolidation of rocks lasted for a full 150 million years until the middle of the palezoic era, a period known as the Mississipian, or maybe the slightly later Pennsylvanian. Then things got more violent. To start it all off, Llanoria sank! It just dropped out of sight and hasn't been seen since. Because of that sinking, the whole Ouachita embayment was squeezed together from south to north and thrust upward. A belt of land 120 miles from north to south was squeezed together until it was only half that wide. The violence of this activity can only be imagined by going out to the Ouachitas today and looking at road cuts and stream cuts. The rocks are tilted, twisted, torn, and wrinkled. The rocks themselves offer silent testimony to the fantastic forces involved. Almost as fast as the mountains were squeezed up, they were eroded down. And after this first burst of violent activity, they settled back, resigned to the effects of the wind and weather, which removed 18,000 feet from their height.

While the Ouachita Mountains were undergoing periods of active formation and others of erosion, new activity started to the north. With the St. Francis Mountains as the center, a large area of rock was pushed straight up. There was little or no folding there, but rather the earth's forces simply lifted the ocean bottom rock from the sea to an elevation of three or four thousand feet.

During the rest of paleozoic era and through the middle of the mesozoic ("middle life") era, a period of 50 million years, the Ozarks and Ouachitas were leveled by erosion several times and always they were pushed up again, tenaciously clinging to existence.

The mountains were not the only things changing, though. Life, both in the sea and on the land, was developing a myriad of forms. In Mississippian times sharks had become abundant. Sharks have modified scales for teeth, and though as anyone will admit these function admirably as teeth, they fall off readily. Therefore, sharks have their teeth in rows and as the outer teeth fall out they are replaced by the teeth of inner rows. The results of this is that sharks teeth are one of the common fossils of Arkansas rock and are the most common vertebrate fossil.

In the lowlands, between the two mountain ranges, land vegetation developed. Hundred-foot high Scale Trees grew on the edges of pools, shallow lakes, and swamps. Their remains formed immense beds of peat which were later transformed into coal. Amphibians ruled the land and reptiles and winged insects made their appearance. Then in early mesozoic, drying climate destroyed many of the amphibians but at the same time favored the rise of the dinosaurs.

A hundred and thrity million years ago, the Cretaceous period of the Mesozoic era begun. At that time, the northern two-thirds of Arkansas and adjacent areas of states to the east, north, and west had emerged from the sea. Northeastern Arkansas was much different from that area today, though. It was rocky and hilly much like the mountain areas to the west. Dinosaurs roamed the land during the warm climate of those days and a new invention made its appearance, one which was to have profound effects on the character of life to come. The invention was the flower.

At the beginning of Cretaceous the edge of the sea in the area of Arkansas ran in a more or less east-west direction across the state at about the latitude of Hot Springs. The southern third of the Ouachitas was probably submerged by the sea at that time.

Minute animals were abundant in those waters and their microscopic remains drifted down in a steady rain to create beds of chalk and to mix with clay to form limy marl. Snails and oyster shells drifted into those deposites to form the heavily laden fossils collecting areas of southwestern Arkansas. At that time, the Gulf of Mexico was connected to the Artic Ocean by a shallow sea which covered the flat plains to the west. The water from the western Ouachitas and Ozarks drained into that sea while the drainage from the eastern and southern slopes was into the Gulf of Mexico. Then during the middle of the Cretaceous period, major changes began to occur in the rocks at the surface of the state. The southern Ouachitas rose from the sea and along with them the extreme southwestern corner of the state. This uplift cut off the western sea from the Gulf and transformed it into an inland sea which eventually became lakes and marshes.

Some of the ranges of the Ouachitas, like the Cossatot Mountains, had been submerged intact and when they rose again their valleys had been filled. The uplift created a high plateau of ocean bottom sediments with a slight north to south slope. Rivers began flowing southward over this surface and when they cut down to the tops of the mountains they maintained their course and continued to cut down through the mountains. Tributaries formed in the valleys

and eventually cleaned out all of the ocean deposits. Today the pattern remains as a unique situation where streams flow across long ridges with spectacular falls and rapids at each ridge rather than taking the easier route of flowing along the valleys. (See rivers map in Appendix)

Meanwhile in eastern Arkansas another major change was taking place. There the paleozoic rocks which had been leveled by weather and time began warping downward. As they did, the Gulf of Mexico advanced northward over them and created a bay which geologists would later call the Mississippi Embayment. Although the bas rocks themselves eventually warped downward over four thousand feet, they did so slowly enough that sediments filled the bay almost as quickly as it formed. The sea was never very deep and occasionally was so shallow that land plants could thrive there. The remains of these plants formed beds of peat which in turn were later transformed into lignite, a form of coal.

Toward the end of Cretaceous, the climate cooled again and the age of the great reptiles ended. That change made warm-bloodedness more valuable and heralded the age of mammals. Birds multiplied. The new era was the Cenozoic, beginning 65 million years ago, the time of "recent life".

The first period of the Cenozoic era is known as the Tertiary. The Coastal Plain during the Tertiary was characterized by advance and retreat of the gulf. In the mountains, periods of erosion alternated with slight uplifts which helped form their presently existing shape. During that time, the final plateau surfaces of the Ozarks were formed. Both the Ozarks and Ouachitas were eroded two or three times during that period into low-lying, relatively flat lands known as peneplains, then uplifted again as relatively flat-topped mountains of about the same height. The results of this process are far more apparent, however, in the Ozarks where three plateau surfaces are apparent, the Boston Mountains, the Springfield Plateau and the Salem Plateau. In the Ouachitas the process of peneplanation is less apparent but probably did occur.

One really drastic change in drainage of the mountains occurred during Tertiary or shortly thereafter. Until that time, drainage from the western slopes of the Ozarks and Ouachitas was to the west and drainage from the eastern part of the mountains was to the east. The general land level of the Arkansas River Valley was near the present level of the tops of Mt. Magazine or Petit Jean Mountain. The Arkansas River ran from the vicinity of Magazine Mountain to the east and another river ran westwardly from that point. The Arkansas River had been eating backward into the mountains, though, and eventually wore through the divide. It was much lower than the westward flowing river which had been flowing into the inland swamps and lakes to the west, and eventually reversed the flow of that river and drained the western plains.

Time had advanced to the Quaternary, beginning two million years ago. Across the land wandered most of the animals we know today, but many others which we would consider strange. Primitive horses, camels, saber-tooth tigers, and mastodons all traveled Arkansas during that time. The Oak-Hickory forest which reached its culmination in this area was well developed. Much of Arkansas would look familiar to us, but very different in detail.

The Mountains had reached the shape they retain today but there were still important changes to come in the lowlands, especially those of eastern Arkansas. The shoreline of the Gulf of Mexico had more or less assumed its present position, but rivers and lakes were to have significant effects on the lowlands of Arkansas.

The lowlands of southern and southwestern Arkansas retained their ocean bottom character with rolling topography and a surface of sand and gravel. As the ocean receded from the Mississippi Embayment in eastern Arkansas, however, the embayment was traversed by large rivers which completely reworked the land

by hauling away the ocean-bottom sand and gravel and replacing them with the sand, silt and clay which those rivers carried. The rivers meandered over most of the plains of eastern Arkansas. At one time the Ohio flowed through extreme eastern Arkansas, the Mississippi to the west of it, and the Arkansas still further west. These three great rivers didn't join until they were well to the south of Arkansas. Their power to shape the land varied with the advance and retreat of the glaciers. When the glaciers advanced (never nearer than the middle of Missouri), the rivers would dry to only a trickle. But when the glaciers began melting, the rivers would swell to torrents which would cover the land with sediments. Occasional minor subsidence, or lowering, of the land would create large swamps where deep beds of clay would be deposited.

In northeastern Arkansas, a slight divide was left where the Mississippi and Ohio did not meander. Dust piled up on this divide to a depth of 50 to 100 feet and finished forming Crowley's Ridge. How this occurred is uncertain, but may have happened this way: First, the rivers during a period of glacial retreat coated the lowlands with powdered rock from the north. After that mud dried, the wind began to blow it around at which point the divide acted like a "fence" which the dust could pile up against. Some dust also piled up against the Ozark Mountains.

By late in Quaternary, the Mississippi Delta and Crowley's Ridge were formed and Arkansas had reached its present shape.

The glaciers did not affect Arkansas solely through the amount of water flowing through its rivers. They had effects on the climate which are apparent even today. During glacial advances, climate was cool and moist. Northern plants and animals moved south in response to the changes. The Oak-Hickory forest retreated southward, remaining in Arkansas only in the warmest locations on the south slopes of the mountains. That forest was replaced by the Beech-Maple forest of the north. As climate warmed again during the interglacial periods, the Oak-Hickory forest returned and the Beech-Maple forest retreated further north, remaining in Arkansas (as it does today) only in the coolest locations on the north slopes of the Mountains.

During the driest, warmest parts of the interglacial periods rainfall dropped so low that on drier sites the trees of the forest could not survive, and were replaced by desert shrub vegetation from the southwest.

The last glacial advance ended about 11,000 years ago. The climate became warmer and drier from 8700 to 7000 years ago, was cold, dry desert from 7000 to 4500 years ago, and has moderated since then.

These variations have had some noticeable effects on Arkansas. For one thing there are plants, like cactus, which still are found in the Ozarks, left over from the desert conditions of the past. Also, the alternating moist periods associated with glacial advance and the dry times of the interglacial periods created striking terraces along the stream valleys in the mountains. Finally as the climate became moister, most of the desert vegetation was succeeded by prairie, much of which persisted even to the time of European settlement.

An interesting phenomenon associated with the Arkansas desert and prairie is the presence around Arkansas of low mounds two or three feet high and 40 or 50 feet in diameter. These mounds are usually referred to as prairie mounds, or more expressively, as prairie "pimples" and the explanations for them are numerous.

A common explanation is that they are Indian mounds, but artifacts are usually not associated with them. Another idea easily disproved, is that the mounds were formed by pockets of gas pushing up the surface of the land. Some people lean toward anthill origins, or even prairie dog colony origins (giant prairie dogs, it seems). A more scientifically acceptable theory is based on

knowledge of the period when the climate of Arkansas was cold and arid and the driest sites were occupied by desert shrubs. Those sites characteristically were flat to gently rolling, which allowed the wind to circulate freely, thereby drying out the surface. They also had a subsoil of clay or rock which limited the ability of the plants to obtain groundwater.

Since there was essentially no ground cover between the scattered shrubs, the wind eroded away soil between them and at the same time deposited soil under the shrubs, leading to the formation of the mounded surface.

The climate has moderated gradually since that time, and prairie vegetation has replaced the desert plants. Grasses are adapted to a climate which is too dry for trees and too moist for desert. When our climate moderated enough for these conditions to exist, the areas which had been desert became grassland. When settlers arrived, they associated the mounds with prairie, so they called them "prairie" pimples but they might more appropriately by called "desert" pimples instead. Though the pimples are generally associated with prairie, they are often to be seen in forests as well. The climate of the state has continued to get moister and as it has done so, trees have gradually overgrown the prairies. Man has hurried the process by plowing the prairies and even leveling off the pimples.

The largest prairie in the state at the time of settlement was the half-million acre Grand Prairie which extended from Lonoke to Arkansas Post. Now, because of the pressures of rice cultivation, virtually all evidence of its prairie history have been obliterated. Elsewhere in the state, prairie and the pimples have fared somewhat better. Prairie pimples can be found near Fayetteville and along the terrace land in the Arkansas River Valley from Ft. Smith to Conway, along the Delta terraces from Jonesboro to Brinkley and from Bald Knob to Searcy and in the Coastal Plain from Monticello to Crossett, and from Arkadelphia to Hope.

It was sometime during the glacial epochs that the mammoth, the saber-tooth tiger, the primitive horse, and the camel disappeared. However, a new creature arrived at this time, one which was to have effects on the land as profound as the glaciers. The age of mammals was succeeded by the time of man.

THE NATURAL DIVISIONS
THEIR GEOGRAPHY AND PHYSICAL AND BIOLOGICAL CHARACTERISTICS

The preceding look at how Arkansas came into being provides the background necessary for understanding the geography of Arkansas as it exists today. As stated earlier, there are six major natural divisions which comprise Arkansas today: the Ozark Mountains, the Ouachita Mountains, the Arkansas River Valley, the Coastal Plain, the Delta, and Crowley's Ridge.

OZARK MOUNTAINS

The Ozark Mountains occupy the northwestern corner of the state touching the Arkansas River Valley on the south and the Delta on the east. The boundary between the Ozarks and the Delta is easily seen, but the boundary between the Ozarks and the Arkansas River Valley is harder to place precisely. The Ozark Mountains often rise very steeply in an escarpment from the Arkansas River Valley, so that the boundary is easily discernible on topographic maps of those areas. In other areas where the mountains merge imperceptibly into the Valley the 750-foot contour line has been arbitrarily considered the boundary. (See topography map in Appendix)

The Ozarks are plateaus, uplifted as a unit with few folds (tilts) or cracks (faults). The ruggedness of these mountains is due to erosion of the plateaus by swift rivers rising in them, and demonstrates both the power of the rivers and the length of time they have existed.

OUACHITA MOUNTAINS

By contrast, the Ouachita Mountains display extensive folding and faulting. Uplift represents only a minor circumstance in their formation. Though erosion has played its part, the basic shape of the Ouachitas is a result of the pronounced folding which has produced a mountain system that is essentially a series of east-west-trending ridges; only in the southernmost part of the Ouachitas is uplift a dominant process. (See geology map in Appendix)

The typical plant communities of the two mountain systems also are different. The Ouachitas are covered primarily with a mixed Shortleaf Pine-upland hardwood type of forest, while the Ozarks are covered primarily with an upland hardwood forest. (Although Shortleaf Pine is present, particularly near the southern boundary of the Ozarks and on the cherty escarpments farther north). In fact, the oak-hickory forest is better developed and more continuous in the Ozarks than anywhere else in the United States. The nation's largest areas of oak-hickory forest lacking pine are in southern Missouri and northern Arkansas.

ARKANSAS RIVER VALLEY

The northern boundary of this synclinorium is the Ozark Mountain boundary which has been described already. Its southern boundary is just north of Dutch Creek Mountain and Poteau Mountain in the west and Cadron Ridge

in the east. The boundary follows the tracks of the Chicago, Rock Island, and Pacific Railroad from Perry to Danville, up Dutch Creek from Danville, and down the Poteau River to the state line. Thus Petit Jean Mountain and Magazine Mountain are located within the Arkansas River Valley.

This area is sometimes included within the Ouachita Mountain Division because its folded, faulted structure with east-west-trending ridges and valleys shows great similarity to the overall structural pattern of the Ouachita Mountains and separates it from the overall pattern of the Ozarks. However, the Arkansas River Valley not only separates the two highland divisions but also provides continuity between them. In many areas the Arkansas River Valley merges imperceptibly into the Ozark uplifts on the north and the Ouachita ridges on the south. Yet within the Valley are structures unique to it--synclinal mountains, mesas, cuestas, and the broad bottomlands of the Arkansas River itself. Although the valley is more rolling than mountainous, the greatest elevation as well as the greatest relief in the state occur at Magazine Mountain.

The Arkansas River Valley is, then, not only a transitional subdivision between the two mountain systems but also a unique region in itself. Its surface rocks are primarily sandstone and shale, with alluvium along the Arkansas River and its large tributaries. Its vegetation is a diverse combination of Shortleaf Pine and upland hardwoods on the uplands with bottomland hardwoods dominating on the lower alluvial soils. (See soils map in Appendix)

COASTAL PLAIN

The Coastal Plain is in contact with the Ouachita Mountains along its northeastern boundary. The boundary between Coastal Plain and the Ouachita Mountains is the boundary between the more recent deposits of the coastal plain and the older rocks of the mountains. The two divisions also have radically different topography. In fact, the slopes separating the mountains from the Coastal Plain are often so steep that there are rapids or waterfalls at the points where streams leave the mountains and the term "fall line" has been used to describe the boundary. The boundary between the Coastal Plain and the Delta lies along the junction of the Tertiary formations of the Coastal Plain with the recent alluvium of the Delta. This occurs along U.S. Highway 365 from Little Rock to Hensley and then along the Arkansas River from Hensley to Pine Bluff and long Bayou Bartholomew from Pine Bluff to the Louisiana state line.

The surface of the Coastal Plain is rolling and, except in riverbottoms, the surface deposits are of ocean-bed origin dating from the Cretaceous and Tertiary periods of 135 million to 70 million years ago. It has moderately to rapidly permeable soils. The general forest type is Loblolly Pine-hardwood mixture of relatively uniform composition. (See forest types in Appendix)

DELTA

The Mississippi Alluvial Plain, usually referred to in Arkansas as the "Mississippi Delta" or the "Delta", occupies the eastern part of the State, bounded on the southwest by the Coastal Plain and on the northwest by the Ouachita Mountains and the Ozark Mountains. The Ozarks-Delta boundary is a

northeastward extension of the fall line that separates the Ouachitas from the Gulf Coastal Plain.

In the Delta the work of large rivers has been dominant in forming the character of the land. The Arkansas River, the White, the St. Francis, the Mississippi, even the Ohio at one time, have flowed through this region cutting away older deposits and building up deposits of sand, gravel and clay that they have transported from slopes as distant as those of the Rockies and the Appalachians.

Most of the typical Coastal Plain formations have been covered by more recent river-borne deposits. Alluvial deposition of sediments continues even now. The Delta is flatter than the Coastal Plain, its elevations varying only about 150 feet in the entire 250-mile length of the division (from Missouri on the north to Louisiana on the south.) Streams are meandering and lower than the general level of the land. The soil is deep but often almost impermeable; consequently, drainage is poor. The vegetation of this division is very different from that of the Coastal Plain too. The Loblolly Pine, universally present in the Coastal Plain, is absent from most Delta forests which are composed of various bottomland hardwoods adapted to the wet, poorly drained soils.

CROWLEY'S RIDGE

One more important division should be recognized: Crowley's Ridge. Although completely surrounded by the Mississippi Alluvial Plain, Crowley's Ridge differs from it in important respects.

Topographically, the ridge is easily discernible because it rises steeply 250 feet above the almost flat Delta and extends about 150 miles through Arkansas and on into Missouri. It is heavily mantled with loess (wind-blown dust) described already, similar to the bluffs along the Mississippi River in western Tennessee. Its forest seems more closely related to the Tulip Tree-Oak forest of the Tennessee hills to the east than to the Oak-Hickory forest of the Ozarks to the west.

THE SUBDIVISIONS AND SECTIONS

It is possible to examine each of the major natural divisions in detail to determine whether differences in topography, geology, vegetation type, or other characteristics such as soil type or drainage patterns make possible the recognition of distinctive and ecologically meaningful subdivisions or sections.

With this idea in mind, the following distinctive portions of the five major divisions can be recognized: within the Ozark Mountain Division there are three subdivisions: the Salem Plateau, the Springfield Plateau, and the Boston Mountains; within the Ouachita Mountain division there are three subdivisions: the Fourche Mountains, the Central Ouachita Mountains, and the Athens Piedmont Plateau; within the West Gulf Coastal Plain Division there is one distinctive area: the Southwestern Arkansas section; within the Mississippi Delta Division two distinctive sections may be seen: the Grand Prairie and Northeastern Arkansas; within the Crowley's Ridge Division and the Arkansas River Valley Division there are no major subdivisions or sections.

SUBDIVISIONS OF THE MAJOR DIVISIONS

The subdivisions of the Ozark Mountains are the three plateaus that form this mountain system. (See Subdivision Map in Appendix) The Salem Plateau is in the northeastern part of the Arkansas Ozarks, the Boston Mountains are the southwestern part of the division, and the Springfield Plateau extends in a narrow band between them.

The Boston Mountains are the highest of the plateaus and are the most rugged portion of the Ozark Mountains. Their local relief, which in places exceeds 1500 feet, and their generally steep slopes and overall ruggedness are the cause of their being termed the Boston Mountains rather than the Boston Plateau. The Salem Plateau has the lowest elevation of the subdivisions; the Springfield Plateau being intermediate in elevation between the other two. Although the two northern subdivision are referred to as plateaus, they too have been extensively eroded and, in places, are quite rugged. The boundaries separating all of these subdivisions are distinctive because the change in elevation is usually abrupt, with the land rising from one plateau to the next higher in an escarpment.

As an example, the ruggedness of the Eureka Springs area is due to its location on an escarpment which separates the Springfield Plateau from the Salem Plateau. Similarily, the ruggedness of the upper Buffalo River area is partly accounted for by the proximity of the escarpment which separates the Boston Mountains from the Springfield Plateau. The gradient of that river and the ruggedness of its surroundings decrease as it crosses the Springfield Plateau, and both increase again during its plunge down the escarpment separting the Springfield and Salem plateaus.

Though the primary distinction between the three subdivisions of the Ozark Mountains is topographic, differences may be seen also in the surface rocks and to a lesser extent in the vegetation types. Surface rocks of the Salem Plateau are mostly limestone or dolomite with a few large outcrops of sandstone. The surface rock of the Springfield Plateau is composed of limestone and chert, and the surface rock at the summits of the Boston Mountains is sandstone. In both the Springfield Plateau and the Boston Mountains shale sometimes occurs at the surface. The major distinction to be seen in the vegetation of the subdivisions is that Shortleaf Pine is more common in the southern Boston Mountains than elsewhere in the Ozarks. Its only major areas of occurrence in the northern Ozarks are the sandstone areas of the Salem Plateau and the rugged and cherty land along the two escarpments, such as north of Huntsville near Eureka Springs, east of Rogers, and around the lower end of the Buffalo River. (See 1930 Geological Survey map in Appendix)

The subdivisions of the Ouachita Mountain Division, like those of the Ozark Mountains, are based on differences in topography and physiography.

The Fourche Mountain subdivision lies south of the Arkansas River Valley division. It occupies a belt about 25 miles wide (north to south), extending from the Oklahoma state line to near Searcy. Its northern boundary has already been defined as the southern boundary of the Arkansas River Valley and it is bounded on the south by the novaculite uplift of the Central Ouachita Mountains.

The Fourche Mountains are parallel ridges with maximum elevations and maximum local topographic relief toward their western end. The ridges have sharp, narrow crests and tend to be very rugged. It is interesting to note that the Arkansas River crosses these mountains between Conway and Little Rock.

At this point the ridges are small but still follow the same pattern as their higher western counterparts.

Because of the east-west orientation of these ridges, the temperature and humidity of the mountain slopes vary greatly, northern slopes being cooler and more moist than southern slopes. Northern slopes are typically occupied by mesic (moist) forests of upland oaks and hickories, whereas south-facing slopes are covered with more xeric (dry) forests dominated by Shortleaf Pine. Although this phenomenon occurs throughout the highlands, the regularity of the parallel ridge-and-valley pattern of the Fourche Mountains makes the corresponding vegetation pattern especially clear. The rocks of these mountains are sandstone and shale similar to those of the Arkansas River Valley.

The Central Ouachita Mountain subdivision is basically spindle-shaped. Its boundaries, while geographically difficult to describe, are geologically quite distinct, since they are bounded almost entirely by outcrops of novaculite, the high-quality whetstone known as "Arkansas Stone" or "Ouachita Stone". Within the complex mass of mountains known as the Central Ouachitas there are at least six major named mountain ranges surrounding four major basins. These may be seen on the 1930 Arkansas Geological Survey Map. The Central Ouachita Mountains is the most complex of the subdivisions presented here, whether considered in terms of topography, geology, or vegetation. The rocks of this subdivision are a combination of igneous rock and sedimentary rock of novaculite, sandstone, and shale, representing several geological ages. The topography, while still of basically the east-west ridge and valley pattern typical of the Ouachitas in general, is quite varied; and the vegetation is a complex combination of Shortleaf Pine and upland hardwoods, varying simultaneously with slope, exposure, and geological substrate. The highest elevations are in the Cossatot Mountains (2300 feet), and the lowest are in the Saline Basin (300 feet). In contrast with the impressive rock outcrops of the Cossatot Mountains, some of the land near the larger streams in the Saline Basin is swampy.

The Athens Piedmont Plateau is the southernmost subdivision of the Ouachita Mountains. It is a plateau 400 to 1000 feet high with its surface marked by the characteristic Ouachita Mountain ridges, but they are only 150 to 250 feet high. The rocks of the Athens Piedmont Plateau are the sandstones and shales typical of the rest of the Ouachitas. The southern and eastern border of this plateau is the fall line separating the Ouachitas from the Coastal Plain; the northern boundary is the novaculite outcrop.

Though the geologic structure of the Ozark and Ouachita mountain systems makes it possible to subdivide them into three or four distinct parts of more or less equal importance, the remaining divisions of the state are not clearly further divisible in this manner. However, within these divisions are areas whose character differs significantly from the "normal" character of the division, and each of these will be referred to as a "section" of the appropriate division rather than as a "subdivision".

One such section is the westernmost part of the Coastal Plain Division. It is referred to as the Southwestern Arkansas section of the Coastal Plain following the terminology presented on the Geologic Map of Arkansas prepared by the Arkansas Geological Survey in 1929. This area was so designated because its surface geological deposits date from the Cretaceous Period, rather than from the Eocene or from the more recent periods during which the rest of the Coastal Plain was deposited. Its vegetation also differs from the usual Coastal Plain pattern, including upland hardwood forest, cedar glade, and

blackland prairie in addition to the more usual pine-hardwood association. The northern boundary of this region is the fall line marking the limits of the Athens Plateau; the eastern and southern boundary is the limit of Cretaceous rock, approximately marked by the "Sulphur Wold". This is a north and west facing "scarp" or "cuesta" resulting from the erosion of weak rocks to the north, leaving stronger rocks as a higher ridge with a steep north side. Three of these wolds exist in Southwestern Arkansas, apparently associated with ancient shorelines of the Gulf of Mexico; and they are notable topographic and geological features of this area.

Within the Delta two sections deserve recognition--the Grand Prairie and Northeastern Arkansas.

The Grand Prairie was a large natural grassland located in Lonoke, Prairie, Monroe, and Arkansas counties. It was the largest of the many prairies that occurred in Arkansas at the time of settlement, but most of its native vegetation has been destroyed. It is recognized here as a separate section primarily because the dominant natural vegetation (grasses) of this relatively large area was different from the life-form (trees) which dominated other parts of the Mississippi Alluvial Plain. Recognition of the Grand Prairie as a distint section is intended to draw attention to the problem of why such an area should have existed in this otherwise forested region. The answer to this puzzle may never be known with certainty; but it probably is related to the deep, impervious subsoil of the area, the past climatic history of the area, as described before, and the ability of complex ecosystems to maintain their existence in the face of changed environmental conditions.

Similarly, the designation of Northeastern Arkansas as a distinct section of the Delta division is intended to draw attention to that area, which may differ appreciably from the rest of the Arkansas part of the Delta since the two are separated by Crowley's Ridge. Furthermore, evidence of the New Madrid Earthquake, which occurred in the area in 1812, is still present in this section. The New Madrid Earthquake may well have been the most severe earthquake in the history of the country. It apparently was a result of the downwarping of the bedrock under the Delta, which has already been described. Recent tremors associated with the New Madrid Fault indicate that this process is still occurring.

THE REGIONAL SIGNIFICANCE OF THE DIVISIONS

From a broader point of view, it can be seen that the natural divisions of Arkansas do not exist in a vacuum, but have regional significance as well. (See Regional Map in Appendix)

The Ozark Mountains overlap Arkansas, Missouri, Kansas, Oklahoma, and even outcrop across the Mississippi River in Illinois. One subdivision of the Ozarks, the St. Francis Mountains occurs only in Missouri, another the Boston Mountains only in Arkansas.

The Ouachita Mountains and the Arkansas River Valley are shared by Arkansas and Oklahoma. The subdivisions of the Ouachitas occur in both states, but the highest peaks of the Fourche Mountains are in Oklahoma and the largest part of the Central Ouachitas is in Arkansas.

The Coastal Plain occurs in a broad belt from Texas along the Coast to New England. The largest expanse of the Delta is in Arkansas, but much of it occurs in Mississippi and Louisiana, and small amounts occur in Missouri, Tennessee, Kentucky, and Illinois. Crowley's Ridge extends slightly into Missouri.

LAKES, RIVERS, AND STREAMS OF ARKANSAS

Arkansas is abundantly supplied with surface water. It has about 2700 miles of major streams and rivers and many ponds, lakes, and springs. (Compare the number of today's lakes with the lake shown on the 1835 map in Appendix) These environments provide habitat for distinctive communities of aquatic and semi-aquatic plants and animals and modify many terrestrial types. The natures of the aquatic environments vary with the characters of the natural divisions in which they are located. In the Delta and the Coastal Plain, streams and rivers have a shallow gradient, meandering freely in the flat alluvial bottoms. There, natural lakes, called oxbow lakes, meander scar lakes, or channel scar lakes are formed when streams suddenly change their courses. Lakes of this type, once formed, begin immediately to fill in undergoing succession from open water to dry land. That process may take hundreds or even thousands of years. In the open water of such lakes there are submerged and floating communities of plants and sometimes there are communities of plants living on floating logs. Nearer the edges of a lake, soil and dead plant material accumulate around the roots of emergent plants and gradually fill it it.

In the Ozarks and Ouachitas the gradient is steeper. The streams carve bluffs, canyons, and waterfalls. Early travelers through what is now Arkansas often remarked on the size and clarity of these streams. The Journal of the Long Expedition even suggested that these streams must be fed by an underground river from the Rocky Mountains!

The ridges of the Ouachitas extend from east to west; yet many of the rivers run from north to south, having had to cut through the steep ridges. Rivers such as the Cossatot run in a series of narrow "lakes" of relatively still water backed up behind the resistant rock of the ridges. At a ridge they form steep rapids or "falls". An explanation for this unusual behavior was suggested in the geological history. The pattern appears not only in the relatively flat Athens Plateau but also in the very rugged Cossatot Mountains. In the Cossatot Mountains, the falls produced in this manner are spectacular. Among the most beautiful is Cossatot Falls on the Cossatot River. The narrow constricted passages through these ridges take the form of canyons, sometimes called "shut-ins".

Springs are abundant in the mountains of Arkansas because the porous limestone and chert soil allow rainwater to soak in quickly and be conducted through cracks in the bedrock to openings further down the slopes. Some of these springs are large Mammoth Springs being one of the largest in the country.

In the prairies of the Springfield Plateau are found the only natural lakes in the state other than channel scar lakes. Here sinkholes, formed when a cavity in the underlying limestone collapsed, sometimes hold water.

THE FIRST ARKANSANS

Sometime during the height of the last period of glaciation, 15-20,000 years ago, wandering hunters from Asia following Mammoths and other big game found a strip of land from Siberia to Alaska exposed because the great quantity of water locked up in the glaciers had lowered the ocean levels. This land bridge led them to new hunting grounds. Like people before and since, they found the lure of greener pastures irresistible, and therefore they became the first Americans. Their wanderings led them over much of the new continent, and eventually some of them reached Arkansas.

Over 12,000 years ago these wandering bands called the Paleo Indians or "ancient" Indians, made their appearance in Arkansas. They still lived the nomadic life they had followed for thousands of years pursuing the Mastodon and Mammoth, the giant Beaver and primitive horse-like animals and occasionally being pursued by Sabre-tooth Tigers and other ferocious animals. Their only weapons were stone knivers and spears with sonte points. With only these weapons, they hunted creatures larger than today's elephants and somehow managed to survive.

These Paleo-Indians and their prey were most numerous in Arkansas' Delta. The Delta rivers of that time were being fed by the receding glaciers and were therefore bigger and more actively meandering than they are today. As the rivers changed their courses, they created new swamps and marshes and broke up the forest to provide good habitat for the Paleo-Indians' prey. The highlands and the extreme southwestern part of the state did not provide an abundance of game, and so the visitations there by the ancient indians were infrequent.

About 8,000 B.C. significant changes began to take place in the climate, vegetation, animals and men of Arkansas. The climate, which, since the last glacial advance had been cool and rainy began to get drier. Vegetation became sparser and animal life changed with it. The huge Mastodon, Beaver and giant Bison of the Paleo-Indian period began to decline as their necessary habitat disappeared and soon they became extinct. The Indians responded by changing their lifestyle. They shifted their dependence from big game to smaller game, such as deer and fish and to plants which they could gather. They became more sophisticated with their stalking and developed new inventions such as the "atlatl", or spear thrower. They became socially more organized, living in larger bands in permanent villages to which they would return several times a year. These people are referred to as Archaic Indians ("early Indians").

For several thousand years the Indians of the Delta and Coastal Plains increased in number as they became better adapted to the new environment. Arkansas Indians at that time began to show a characteristic which would continue into the future; they demonstrated both eastern and western influences. While the Indians of the Delta developed a culture which was typical of the Indians of eastern North America, the Coastal Plain Indians, which were most concentrated in the broad alluvial valley of the Red River, developed a culture which overlapped many of the southeastern and the southern Plains styles.

During the middle of this Archaic period from about 5,000 B.C. to 3,000 B.C. a change in the distribution of Arkansas Indians took place: there was a great decline in the Delta population and a simultaneous explosion of population in the Ozarks. There is geological evidence already discussed that it was a much drier time than at present and that much of Arkansas was covered with desert vegetation. Some typical northern forest vegetation (the "Beech-Maple Cove Forest") which has survived in Arkansas from the last Ice Age until now

probably survived that dry period by retreating into the cool, moist ravines in the Ozarks and Ouachitas and it is possible that the middle Archaic Indians did so too.

At any rate the Indians did increase their populations in the Ozarks during that period and developed a distinctive lifestyle which had been called the Bluff Dweller. Anyone who has been caught in a rainstorm while hiking in the Ozarks has realized that many of the bluffs there tend to overhang a bit and that a strip of land a few feet or more will remain dry except during a blowing rain. The Indians realized this too, and often took advantage of it. They sometimes used the deeper bluff shelters as more or less permanent habitations. The remains they left behind, even perishable items such as bones and baskets, have been preserved in these dry shelters even until now.

During late Archaic from 4,000 B.C. to about 500 B.C., Indians returned to the Delta. Probably the climate had moderated enough that the former desert areas had been occupied by prairie grasses, with associated bison, elk, deer, prairie chickens and other animals of the prairie and forest edge. The Indians of the Delta then lived in somewhat settled villages, sometimes with buildings on low mounds. They still obtained their food from hunting and gathering but they were experts in both and could live in villages. They had dogs, stone tools for grinding nuts, stone pipes, ornaments and weapons. The Delta and the Arkansas River Valley were probably the most heavily occupied parts of Arkansas at this time with somewhat fewer people in the other divisions.

Around 500 B.C. new cultural changes began taking place. The hunting-gathering lifestyle of the Archaic Indian began to give way to agriculture. At about the same time the Indians began to learn how to make pottery. The tribes still roamed in search of game and wild plants, but they returned periodically during the spring and summer to tend their fields.

During Paleo-Indian times the Indians had buried their dead any place that was convenient. During Archaic times they had started to use cemeteries, and they occasionally would enter their dead in mounds. After repeated burials over a period of centuries these mounds sometimes became very large (over 50 feet high). This habit has led some archaeologists to term this the Burial Mound Period. The culture of this time is referred to as the Woodland Indian tradition.

The greatest population centers in Arkansas during at least the early part of that period were in the Coastal Plain and the Arkansas River Valley. They were influenced by cultures in Oklahoma and Louisiana. The northern Delta, which was the scene of much cultural activity during late Archaic, was virtually abandoned during early Woodland. Nobody knows why, but it is possible that the number of people in that area responded to changes in the forest. During Paleo-Indian and early Archaic Indian times the forest had provided good habitat for the animals which those Indians had hunted. The desert conditions of middle Archaic times then caused abandonment by the prey animals, and consequently by the Indians who depended on them. Then, in late Archaic, the desert was succeeded by prairie and the forest began to return creating an abundance of "edge" habitat which resulted in an abundance of wildlife and the Indians returned. During early Woodland, it may be that the forest of the north Delta developed to the point that it overgrew most of the prairies and formed a closed canopy with large trees and little food at ground level for wildlife, and so the Indians left again.

They returned during late Woodland brining with them culture form Missouri and the Ohio River Valley and the ability to make their living by tilling the soil. Perhaps the agricultural openings they made increased the amount of game in the area and they probably learned that they could maintain prairie openings by setting fire to the dead grasses early in the spring.

Meanwhile none of the advances of the Woodland Period, not agriculture nor permanent villages, nor pottery, found their way into the Ozarks or the more rugged parts of the Ouachitas. Neither of these divisions, with the exception of the wider valleys of the Ouachitas, offered enough productive soil to make possible the agriculture necessary for permanent villages in which crafts could flourish. The residents of these areas were forced by the limitations of the land to continue a hunting-gathering existence even to the time of the European.

Around 700 A.D. to 1000 A.D. the Indians of Arkansas began to reach the summit of their technology and culture. That time is often referred to as the Temple Mound Period and the lifestyle as the Mississippian tradition. During this period the Indians developed intensive agriculture based on corn, beans and squash, and as a result could live in large villages of 20 acres or more. Hunting and gathering were de-emphasized, but because of the invention of the bow and numerous other weapons and tools, those activities were now far more efficient. Crafts had developed to the point where the Indians of those villages were making beautiful pots, pipes and sculptures as well as intricate beadwork with beads from mussel shells. They had learned that by adding crushed shells as grog to pottery clay they could reduce shrinkage and lessen the tendency to cracking. Socially they had become highly organized with village chiefs and chiefs who were rulers of a number of villages. There were also slaves.

A notable feature of these people though, was their mounds. They no longer used mounds to bury their dead but rather used them as sites for temples for the workship of their gods. Some of these temple mounds still exist at Toltec Mounds State Park and at Parkin. Both these villages were on rivers, Parkin on the St. Francis and Toltec on the Arkansas. Both were fortified, Parkin with a moat and Toltec with an earth wall.

This tradition reached its most advanced form in Arkansas in the Delta and in the wide alluvial valley of the Red River in the Coastal Plain. These large villages required intensive agriculture and only those two areas of Arkansas provided a large enough expanse of good soil to support that agriculture. Indians of other parts of Arkansas were influenced by those tribes though, and lived similar lifestyles modified to meet local circumstances.

At that time, the Arkansas Delta was being influenced by cultures of both north and south. To the north, the Fairmont culture which built the fantastic mound complex at Cahokia near St. Louis was influencing tribes in the northern Delta while the tribes south of the Arkansas River were most influenced by the Coles Creek culture of Louisiana.

The Coles Creek culture also spread to Southwestern Arkansas and Southeastern Oklahoma where it soon became transformed into the Caddoan Culture.

By the 16th century A.D. most of the Indians of Arkansas were under the influence of the great Mount Builder cultures, which were about to be "discovered" and destroyed by De Soto.

THE COMING OF THE EUROPEANS

It is generally accepted that De Soto was the first European to visit the Indians of Arkansas, but it just may be that the Vikings, who are now generally conceded to be the discoverers of American, are in fact also the discoverer of Arkansas. The state of Oklahoma has a state park dedicated to this proposition, so it at least ought to be mentioned here.

The legend dates back to the late 19th century when a slab of sandstone twelve feet high, ten feet wide and sixteen inches thick was first noticed near Heavener, Oklahoma, a few miles from the Arkansas state line. The slab had apparently broken off a ledge and toppled into a vertical position. What made it unusual was that carved into it were strange letters six to nine inches tall.

The stone was locally called "Indian Rock" but that idea didn't suit Gloria Farley, who first visited the rock in 1928. She developed the notion that the stone was carved by Vikings, but it was over 30 years later that she finally convinced a historian of early Viking travels to come to Oklahoma to examine the stone. He was Frederick J. Pohl and he was convinced enough of the Viking authorship of the carvings to devote a chapter of his book "Atlantic Crossings Before Columbus" to it. Several other historians agreed and variously translated the runes to mean "Sun Dial Valley", "Monument Valley", "Boundary Valley", and "Earth Spirits Dale".

Then in 1967, a Norwegian-born U.S. Army Cryptographer who had co-authored a book on cryptography in runic carvings entered the picture. He is Alf Monge and he showed that the carvings were a cryptopuzzle whose solution was the date "November 11, 1012". Other such stones have since been discovered in Oklahoma and all carry dates ranging from 1012 to 1024. Four runestones are known in New England and all carry the date 1009 and appear to use the same code "tricks" as those of Oklahoma. This indicates that the same person carved all of the stones.

There is additional evidence for the legend also. According to Norse Sagas, Leif Erikson explored "Vinland", which he took to be an island but which was in reality New England and Eastern Canada. In 1009 an expedition set out to explore Vinland and returned to Greenland in 1012 - except for one ship which sailed south to circumnavigate Vinland. Nothing was heard of that ship again, and it may have carried the Norse explorers who carved the runestones in Oklahoma.

Now Mrs. Farley and Mr. Monge indicate that they have located other Viking traces in Arkansas.

All these stones, of course, could be the work of a prankster. However, the prankster would have to have braved Indians and rattlesnakes in the wilderness of Oklahoma in the early 19th century after having carved his stones in New England. In addition, he would have to have known two Norse runic alphabets, a Medieval perpetual church calendar, cryptography and Nordic tradition. Quite a sense of humor!

Vikings notwithstanding, Hernando De Soto was the first European to see the Indians of Arkansas and produce historical records of his travels. There are three principal tales of his journey written by Spaniards who accompanied him. They sometimes contradict, sometimes corroborate each other, but they paint a vivid picture of their travels and the picture is not always a pretty one.

De Soto was a spanish conquistador fresh from truimph in central and south America who was appointed Governor of Florida and set out in 1539 to explore his realm. He began the journey with six hundred men, two hundred horses, and among other things, a herd of hogs. His object was the universal object of conquistadores - gold.

He marched through the present states of Florida, Georgia, North and South Carolina, Alabama and Mississippi for two years before reaching the Mississippi River, or as he called it, the Rio Grande. During this time his party had set a pattern of attacking each Indian tribe they met, taking slaves, plundering food, shelter and whatever valuables they might find (such as pearls) and marching on. Usually the slaves were freed when a new group was taken.

The Indians fought bravely and came close to defeating De Soto on a few occasions. They learned that their stone-tipped arrows would do no good against the mail and armor worn by the Spaniards so they removed the points. Then the arrow would strike the mail and split. The splinters would drive through the mail and inflict serious wounds. Occasionally the Spaniards would build boats to cross large bodies of water whereupon the Indians would risk life and limb to turn over the boats so the armour-covered Spanish could drown. Mosquitos, too, wore down the strength of the Spanish. The writers of the narratives mention having to laugh at themselves sometimes when their faces would be distorted from multitudes of mosquito bites.

So De Soto and his men were not invulnerable when they reached Arkansas, but they were still powerful. Immediately after crossing the Mississippi River, they found the biggest and "best" villages they had found in their years of exploration. It is unclear where De Soto crossed the river, but it may have been south of Helena. (See travels map in Appendix) He began marching upriver and may have come to Crowley's Ridge:

> "He came to a small river, over which a bridge was made, whereby he crossed. All that day, until sunset, he marched through water, in places coming to the knees; in others, as high as the waist. They were greatly rejoiced on reaching the dry land; because it had appeared to them that they should travel about, lost, all night in the water. At midday they came to the first town of Casqui, where they found the Indians off their guard, never having heard of them. Many men and women were taken, much clothing, blankets, and skins...
>
> This land is higher, drier, and more level than any other along the river that had been seen until then. In the fields were many walnut-trees [probably pecan] bearing tender-shelled nuts in the shape of acrons, many being found stored in the houses.
>
> * * *
>
> There were many mulberry-trees, and trees of ameixas [plums] having fruit of vermilion hue, like one of Spain, while others were gray, differing, but far better. All the trees, the year round were as green as if they stood in orchards, and the woods were open.
>
> The Governor marched two days through the country of Casqui, before coming to the town where the Cacique was, the greater part of the way lying through fields thickly set with great towns two or three of them to be seen from one."

He marched northward another day and then sent a small party further north, but they found only canebrakes:

> "They travelled seven days through desert and returned in great extremity eating green ameixas and maize-stalks which they had found in a poor town of seven or eight houses. The Indians stated that thence towards the north, the country, being very cold, was very thinly populated; that cattle [buffalo] were in such plenty, no maize-field could be protected from them, and the inhabitants lived upon the meat. Seeing that the country was so poor off for maize that there could be no support, the Governor asked the Indians in what direction there were most inhabitants; and they said that they had knowledge of a large province and a country of great abundance, called Quiguate, that lay in the southern direction."

They then traveled to this village:

> "The Country of Aquiguate, like that of Casqui and Pacaha, was level and fertile, having rich river margins, on which the Indians made extensive fields."

De Soto left the fertile fields of Aquigate, which may have been near the mouth of the Arkansas, and went Northwest to the future site of Little Rock:

> "About forty leagues from Quigate stood Coligoa, at the foot of a mountain, in the vale of a river of medium size:"

Next they seem to have traveled to the hot springs:

> "The beasts [horses] drank so copiously from the very warm and blackish lake, that they came having their bellies swollen with the leaf when they were brought back from watering. To that spot the Christians had wanted salt: they now made a quantity and took it with them. The Indians carry it into other parts, to exchange for skins and shawls."

* * *

> "The Governor informed himself of the country in every direction. He ascertained that toward the west there was a thin population, and to the southeast were great towns, principally in a province, abundant of maize, called Autiamque, at the distance of about eight leagues, ten days' journey from Tulla. The winter was already come. The cold, rain, and snow did not permit the people to travel for two or three months in the year, and the Governor feared to remain among that sparse population, lest his force could not be subsisted for that length of time."

They traveled through the Ouachitas and then down the Ouachita River to the town of Autiamique, near Camden, where they spent the winter of 1541-42:

> "They found in store much maize, also beans, walnuts, and dried ameixas in large quantities. Some Indians were taken while gathering up their clothing, having already carried away their wives. The country was level and very populous."
>
> * * *
>
> "The Christians stayed three months in Autiamque, enjoying the greatest plenty of maize, beans, walnuts, and dried ameixas; also conies, which they had never had igenuity enough to ensnare until the Indians there taught them."
>
> * * *
>
> "On Monday, the sixth day of March, of the year 1542 of the Christian era, the Governor set out from Autiamque to seek Nilco, which the Indians said was nigh the River Grande, with the purpose, by going to the sea, to recruit his forces. He had not over three hundred efficient men, nor more than forty horses. Some of the beasts were lame, and useful only in making out the show of a troop of cavalry; and, from the lack of iron, they had all gone a year without shoes, though, from the circumstance of travelling in a smooth country, they had little need of them."

They traveled South through swamps along the Ouachita River and out of Arkansas. When they reached the Mississippi, De Soto sickened and died, his dreams of gold unsatisfied and his spirit broken. His men slipped his body into the river so the Indians would not find it and learn that De Soto was not a god, that he had portrayed himself as. It required another year for the remainder of his men to decend the Mississippi and make their way to the Spanish settlements in Mexico.

It was over a hundred years later that any other Europeans visited Arkansas, and when they came they found the Indians in a very different condition than De Soto had. The most obvious difference was that there were vastly fewer Indians in Arkansas a century after De Soto. He had been able to travel for days through fields of corn, always within sight of two or three villages; by 1700 there were only a few thousand Indians in all of Arkansas. The social organization of those tribes was much deteriorated too. De Soto had seen chiefdoms where one high chief ruled many villages, where religous ceremonies were conducted in temples on high mounds and where large tribes lived by carrying on intensive agriculture; all of these social customs had disappeared by the 18th century.

What caused these great changes? It is only possible to guess, but it may have been the smallpox carried by the Spaniards decimated the tribes. De Soto's strength may also have demoralized their societies. It is possible

the reason was not even connected to De Soto; a period of unusually severe climate may have made large-scale primitive agriculture impossible.

At any rate, when Europeans again arrived in Arkansas, they found three tribes in possession of the state: the Quapaw, the Caddo and the Osage. Their territory and their lifeways related to the land in much the same way as those of the earlier Indians. The Quapaw lived in the Delta and basically depended on agriculture for survival. The Caddo lived in the Coastal Plain, primarily along the Red River. They also occupied the wide valleys of the southern Ouachitas. They too led basically agricultural lives. Both these tribes lived in settled villages. The Caddo, in fact, led lives very similar to those of the pre-De Soto Indians of their area, and so the Indians of that area were apparently not subjected to as much upheaval after De Soto as those of eastern Arkansas. (See Indians map in Appendix)

The Ozarks, the Arkansas River Valley and the northern Ouachitas were claimed by the Osage, a warlike tribe centered in southwestern Missouri. They lived a hunting-gathering life similar to that of the other tribes which had occupied the Ozarks for thousands of years.

During the time Arkansas was a territory, portions of the state were allotted to the Cherokee and Choctaw, as well as to the tribes who were native here. The Cherokee were given land north of the Arkansas River, where many members of the tribe drifted as their original Tennessee homelands were overrun by whites. This new Arkansas home was land which was claimed by the aggressive Osage so conflict between these two tribes was frequent until treaties had been negotiated.

By 1835, all tribes had been removed from Arkansas and the Indian cultural heritage of the state was a part of its past.

SOME EARLY ARKANSAS TRAVELERS

A good way to get a feeling for the Arkansas of the 18th and early 19th century, for the land, the Indians and the first settlers is through the published writings of some of the early travelers through the state. Luckily, a number of excellent accounts exist.

One of these is the journal of William Dunbar, who along with Dr. George Hunter and a party of 16 soldiers was sent by Thomas Jefferson to explore the Ouachita River in 1804. The year before, Congress had somewhat reluctantly approved the Louisiana Purchase, and Jefferson sent out a number of exploring parties to determine just what he had bought. He no doubt also knew that his exploring parties had to provide exciting information on the new territory in order to silence the critics of his $15 million land deal. Obviously, the big news would come from Lewis and Clark, but they wouldn't arrive back until 1806. News was needed sooner.

Jefferson had a good friend who lived in Natchez, William Dunbar, who informed him of a "boiling spring or fountain" on the upper "Washita". This was possibly the sort of news which would keep the public satisfied until Lews and Clark returned, so Jefferson made Dunbar leader of an exploring party which ascended the river to the springs in the winter of 1804-5.

As Dunbar approached the future boundary of Arkansas, his journal carries these descriptions of the river southwest of Crossett:

> "...continued our voyage; the low lands are still alluvial, at least to a certain depth; an under stratum of clay appears in many places, where the banks have been undermined and broken down: we remarked that since we entered the alluvial country about 32° 52' Lat: we have seen no long moss (Tilandsia) [Spanish Moss] altho' this low damp country seems in all respects well adapted to favor its production; upon enquiry of our plot, he informs us, we shall see nor more of it; probably its limit of vegetation northerly may be fixed by nature near to 33° Lat: Saw a great quantity of the long-leaf pine, which is frequently found in rich and even inundated lands as is the case here; the short leaf or pitch pine on the contrary is always found upon arid lands and generally in sandy and lofty situation; but our Country furnishes it in a hard meagre clay. In the forenoon saw the first swan which was shot by one of our hunters; it was a solitary one whose mate had probably been killed: this is the season when the poor inhabitants of the settlement of the Washita turn out to make their annual hunt; they carry no provision with them but a little indian corn, depending on their guns and ammunition for the rest."

Further upstream near El Dorado:

> "Having been informed of some pit coal [lignite] reported to be in the neighborhood, we determined to explore its position. Doctor Hunter with the Pilot set out for this purpose, and at about 1 1/2 mile N.W. of the Boat found in the bed of a Creek a substance similar to what we had formerly seen under the name of coal; some pieces of it

were very black, solid, and of a homogenous appearance greatly resembling pit Coal, but it was dificient in ponderosity, and did not seem to be penetrated by bituminous matter in a sufficient degree to constitute Coal; we may perhaps therfore be permitted to consider it as vegitable matter in a certain stage of its progress of transmutation into Coal, we were the more confirmed in this option by discovering other fragments, which still retained very evidently the fibrous texture of wood, one piece in particular seemed to have been a large chip taken out by the felling ax. Those last pieces were not so far advanced in the transmuting progress as the first mentioned; although black it was not so perfect, being rather a very dark brown black, retaining the exact form and shape of the wood as it had been separated from the log: as this incipient or imperfect coal was found imbedded among clay and gravel, which appeared to have been washed down by the torrent, no clue could be found to lead to a discovery of the process by which nature effects so extraordinary a change, an ingenious enquirer placed in favorable circumstances, will probably have the good fortune to make this discovery: the time may arrive when the Planter who shall be clearing his Plantation or farm of useless timber, will be enabled from the instructions of the Chemist to place the whole in a situation to be transmuted into an usefull article capable of long preservation This is no doubt the carbonated wood described by Karwan and other Chemists."

* * *

"About a league from the river a little above the slate quarry is a considerable plane called 'prairie de Champignole', often frequented by Buffalo; some salt licks are to be found near it, and in many situations on both sides of this river at small distances from it, we are informed that Salines or salf-licks exist which may be rendered very productive; when this river comes to be settled so necessary an article as marine salt will therefore be in sufficient abundance for the consumption of a full population."

* * *

As they entered the Ouachita Mountains near Malvern they encountered a mighty rapid:

"A little after 4 p.m. we arrived at the Chutes. We found these falls to be occasioned by a chain of rocks of the same hard nature with those we had just seen below, here they

> extended quite across the river, the water making its way over the chain thro' a number of breaches which by the impetuosity of the torrent had been worn out of the rock: this chain seemed to proceed from a lofty rocky hill on the left side the appearance of which conveyed the idea, of its having been cut down by the abrasion of the waters to its present level: the various breaches thro' which the water poured, were so many cascades, thro' one of which it was necessary to pass; otherwide the Barge must remain below the Chutes: it was quite uncertain which of the Cataracts ought to be preferred; it was also doubtful whether our barge (9 feet wide) could find sufficient breadth & depth of water clear of pointed rocks to pass over the Chutes."

* * *

Dunbar passed the "Chutes" after a full day of toil nearly losing his barge and arrived at the hot springs:

> "With respect to the quantity of hot water delivered by the spring, I made the following rough estimate.
> There are 4 principal springs, 2 of inferior note and a number of drippings or drainings all issuing from under the rock immediately over the creek...
>
> * * *
>
> We found a kettle containing eleven quarts was filled by this spring in eleven seconds; Hence the whole quantity of hot water delivered by the springs issuing visibly from under the hill may amount in one minute to 163 gallons or 377 1/2 Hhds of 33 gallons each pr. day, which is equal to a handsome brook."

In late 1818 and early 1819 two men arrived in separate parts of Arkansas, bent on making scientific investigations. They both later published their journals, which contain valuable descriptions of the new territory. They are Henry Rowe Schoolcraft and Thomas Nuttall.

Henry Rowe Schoolcraft, in later life, attained distinction as an ethrologist and published several definitive works on the American Indian. When he visited Arkansas Territory, however, he was more interested in geology and his journal entries contain much information on the rocks of the area.

He traveled from Potosi, Missouri southwestward through the Missouri Ozarks, dipped briefly into Arkansas to reach the White River and ascended the river into the heart of Osage Indian Country to near present Springfield, Missouri. Then he descended the White to Poke Bayou (Batesville) and traveled the main road from there to Missouri.

His description of the country near Mountain Home:

> "The country passed over yesterday, after leaving the valley of White River, presented a character of unvaried sterility, consisting of a succession of lime-stone ridges, skirted with a feeble growth of oaks, with no depth of soil, often bare

rocks upon the surface, and covered with coarse wild grass; and sometimes we crossed patches of ground of considerable extent, without trees or brush of any kind, and resembling the Illinois prairies in appearance, but lacking their fertility and extent. Frequently these prairies occupied the tops of conical hills, or extended ridges, while the intervening valleys were covered with oaks, giving the face of the country a very novel aspect, and resembling, when viewed in perspective enormous sand-hills promiscuously piled up by the winds."

He described the Osage Indians:

"In pursuing up the valley of Swan Creek, about nine miles, we fell into the Osage trace, a horse-path beaten by the Osages in their hunting excursions along this river, and passed successively three of their camps, now deserted, all very large, arranged with much order and neatness, and capable of quartering probably 100 men each. Both the method of building camps, and the order of encampment observed by this singular nation of savages are different from any thing of the kind I have noticed among the various tribes of aboriginal Americans, through whose territories I have had occasion to travel. The form of the tent or camp may be compared to an inverted bird's nest, or hemisphere, with a small aperture left in the top, for the escape of smoke; and a similar, but larger one, for one side, for passing in and out. It is formed by cutting a number of slender flexible green-poles of equal length, sharpened at each end, stuck in the ground like a bow, and, crossing at right angles at the top, the points of entrance into the ground forming a circle. Small twigs are then woven in, mixed with the leaves of cane, moss, and grass, until it is perfectly tight and warm. These tents are arranged in large circles, one within another, according to the number of men intended to be accomodated. In the centre is a scaffolding for meat, from which all are supplied every morning, under the inspection of a chief whose tent is conspicuously situated at the head of the encampment, and differs from all the rest, resembling a half cylinder inverted. Their women and children generally accompany them on these excursions, which often occupy three months. The boys and lazy drones who do not help in hunting, are obliged to eat the intestines of the animals killed. The white hunter, on encamping in his journeys cuts down green-trees, and builds a large fire of long logs, sitting at some distance from it. The Indian hunts up a few dry limbs, cracks them into little pieces a foot in length, builds a small fire, and sits close by it. He gets as much warmth as the white hunter, without half the labour, and does not burn more than a fiftieth part of the wood. The Indian considers the forest his own, and is careful in using and preserving everything which it affords. He never kills more meat than he has occasion for. The white hunter destroys all before him, and cannot resist the opportunity of killing game, although he neither wants

the meat, nor can carry the skins. I was particularly struck with an instance of this wanton practice, which lately occurred on White River. A hunter returning from the woods heavy with flesh and skins of five bears, unexpectedly arrived in the midst of a drove of buffalo, and wantonly shot down three, having no other object than the sport of killing them. This is one of the causes of the enmity existing between the White and the red hunters of Missouri."

As he ascended the White, he arrived at the prairies typical of southwestern Arkansas and Northwestern Missouri:

"The prairies, which commence at the distance of a mile west of this river, are the most extensive, rich, and beautiful, of any which I have ever seen west of the Mississippi river. They are covered by a coarse wild grass, which attains so great a height that it completely hides a man on horseback in riding through it. The deer and elk abound in this quarter, and the buffalo is occasionally seen in droves upon the prairie, and in the open high-land woods. Along the margin of the river, and to a width of from one to two miles each way, is found a vigorous growth of forest-trees, some of which attain an almost incredible size. The lands consist of a rich black alluvial soil, apparently deep, and calculated for corn, flax, and hemp. The river banks are skirted with cane, to the exclusion of all other underbrush; and the lands rise gently from the river for a mile, terminating in high-lands, without bluffs, with a handsome growth of hickory and oak, and a soil which is probably adapted for wheat, rye, oats, and potatoes. Little prairies of a mile or two in extent are sometimes seen in the midst of a heavey forest, resembling some old cultivated fields, which has been suffered to run into grass.

Near our present encampment are some bluffs, which serve to diversify the scene, and at the foot of which is situated a valuable lead-mine. A country thus situated, cannot fail to present a scene of great beauty in the season of verdue, and even now, in the depth of winter, wears a pleasing aspect. It is a mixture of forest and plain, of hills and long sloping valleys, where the tall oak forms a striking contrast with the rich foliage of the evergreen cane, or the waving field of prairie-grass. It is an assemblage of beautiful groves, and level prairies, of river aluvion, and high-land precipice, diversified by the devious course of the river, and the distant promontory, forming a scene so novel, yet so harmonious, as to strike the beholder with admiration; and the effect must be greatly heightened, when viewed under the influence of a mild clear atmosphere, and an invigorating sun, such as is said to characterize this region during the spring and summer. Taking these circumstances into view, with the fertility and extent of soil, its advantages for water-carriage, and other objects, among which its mines deserve to be noticed,

it offers great attractions to enterprizing emigrants, and particularly to such as may consider great prospective advantages an equivalent for the dangers and privations of a frontier settlement."

He determined to float down the White River to Batesville:

Saturday, Jan. 9th

"Having, in pursuance of this determination, purchased a canoe from the hunters, and made other necessary preparations, we were ready at an early hour in the morning to embark. We now found it necessary again to resume the use of our guns, after having for nearly a month been supplied with provisions by the hunters, and for that purpose had procured a quantity of lead and ball. We also put into our canoe some bear's meat smoked, dried venison, corn-bread, and salt, with a few articles reserved from our former pack, which were either necessary or convenient on encamping. The men, women, and children, followed us down to the shore, and after giving us many directions and precautions, and repeating their wishes for our success, we bid them adieu, and shoving our canoe into the stream, found ourselves, with a little exertion of paddles, flowing at the rate of from three to four miles per hour down one of the most beautiful and enchanting rivers which discharge their waters into the Mississippi. To a width and a depth which entitled it to be classified as a river of the third magnitude in western America, it unites a current which possesses the purity of crystal, with a smooth and gentle flow, and the most imposing diversified, and delightful scenery. Its shores are composed of smooth spherical and angular pieces of opaque, red and white gravel, consisting of water-worn fragments of carbonate of lime, hornstone, quartz, and jasper. Every pebble, rock, fish, or floating body, either animate or inanimate, which occupies the bottom of the stream, is seen while passing over it with the most perfect accuracy; and our canoe often seemed as if suspended in the air, such is the remarkable transparency of the water. Sometimes the river for many miles washed the base of a wall of calcareous rock, rising to an enormous height, and terminating in spiral, broken, and miniform masses, in the fissures of which the oak and the cedar had forced their crooked roots, and hung in a threatening posture above us. Perched upon these, the eagle, hawk, turkey, and heron, surveyed our approach without alarm, secure in eminent distance. Facing such rocks, the corresponding curve of the river invariably presented a level plain of rich alluvial soil, covered with a vigorous growth of forest-trees, cane, shrubs, and vines, and affording a most striking contrast to the sterile grandeur on the opposite shore. Here the paths of the deer and buffaloe, where they daily came to

drink, were numerous all along the shore, and the former we frequently surprised as he stood in silent security upon the river's bank. The duck, brant, and goose, continually rose in flocks before us, and alighting in the stream a short distance below, were soon again aroused by our approach; thus we often drive them down the river for many hours together, until our repeated intrusion at last put them to effectual flight. Often a lofty ridge of rocks in perspective seemed to oppose a barrier to the further progress of the river, which suddenly turned away in the most unexpectrd direction at the moment we had reached the fancied barrier, displaying to our view other groups of rocks, forests, plains, and shores, arranged in the most singular and fantastic manner, and in the utmost apparent confusion, but which, on a nearer inspection, developed a beautiful order and corresponding regularity, such as the intelligent mind constantly observes in the physiognomy of nature, and which appears the more surprising the more minutely it is inspected, analyzed, or compared. Very serpentine in its course, the river carried us toward every point of the compass in the course of the day; sometimes rocks skirted one shore, sometimes the other, never both at the same place, but rock and alluvion generally alternating from one side to the other, the bluffs being much variegated in their exterior form, extent, and relative position, giving perpetual novelty to the scenery, which ever excited fresh interest and renewed gratification, so that we saw the sun sink gradually in the west without being tired of viewing the mingled beauty, grandeur, barrenness, and fertility, as displayed by the earth, rocks, air, water, light, trees, sky, and animated nature; they form the everwinding, diversified, and enchanting banks of White River."

* * *

"In our descent this day, we have passed several hunters' cabins on both banks of the river, but met nothing worthy particular note until our arrival at the Bull Shoals, situated twenty miles below M'Gary's. Here the river has a fall of fifteen or twenty feet in the distance of half-a-mile, and stands full of rugged calcareous rocks, among which the water forms and rushes with astonishing velocity and incessant noise. There are a hundred channels, and the strange navigator runs an immiment risk of being dashed upon the rocks, or sunk beneath the waves, whose whirling boiling and unceasing roar warns him of his peril before he reaches the rapids."

* * *

"This is the most considerable obstruction to the navigation of the river we have yet encountered, but it is said to be perfectly safe in high tides, when the rocks are buried by the vernal and autumnal floods."

As he reached the Batesville (Poke Bayou) area:

"Here the main road from Missouri to Arkansaw crosses the river, and a mail is carried from St. Louis to the post of Arkansasw, (now the seat of Territorial Government, March 1820) once a month. Two miles below is Morrison's Ferry, a branch of the same road crossing there, and eight miles farther Poke Bayou, a village of a dozen houses, situated on the north bank of the river, where we arrived at about four o'clock in the afternoon, and were entertained with hospitality by Mr. Robert Bean, merchant of that place.

A gradual change in the face of the country for the last thirty miles, before reaching this spot, is observable. The bottom lands, as you descend, increase in width; the bluffs become more remote, and decrease in height, and finally disappear a few miles above Hardin's Ferry, where that extensive alluvial formation, which reaches to the banks of the Mississippi, commences. From this fork, the scenery is unvaried. A rich level plain, covered with heavy forest-trees and cane-brake, extends as far as the eye can reach, on both banks of the river, gradually depressed toward the Mississippi, where it is subject to semi-annual inundation. At this place, the banks are elevated thirty feet above the present level of the water; and are subject to falling in during the high spring and autumnal floods. In other respects, the situation of Poke Bayou is pleasant, and advantageous as a commercial and agricultural depot. Here we concluded to quit the river, and pursue the Arkansaw road, on foot, through Lawrence, Cape Girardeau, Wayne, and Madison counties toward Potosi. As a preparatory step, we have disposed of our canoe, skins, &c. and provided ourselves with travelling knapsacks.

Tuesday, Jan. 19th

Before leaving the banks of White River, it is due to the hardy, frank, and independent hunters, through whose territories we have travelled, and with whom we have from time to time sojourned, to say, that we have been uniformly received at the cabins with a blunt welcome, and experienced the most hospitable and generous treatment. This conduct, which we were not prepared to expect, is the more remarkable, in being wholly disinterested, for no remuneration in money for such entertainment, (with a very few exceptions,) was never demanded; but, when present, uniformly refused, on the principle of its not being customary to accept pay of the traveller, for anything necessary to his sustenance."

Thomas Nuttall traveled widely through North America on a variety of scientific explorations financed by friends or scientific associations. On his trip through Arkansas Territory, he traveled from Pennsylvania down the Ohio and Mississippi and up the Arkansas to mid-Oklahoma. Then he returned down the Arkansas and descended the Mississippi to New Orleans. He reached the mouth of the Arkansas on his upward journey in January 1819 at the same time Schoolcraft was floating down the White River to the northwest.

As he ascended the Arkansas he made these comments:

> "No change, that I can remark, yet exists in the vegetation, and the scenery is almost destitute of every thing which is agreeable to human nature; nothing yet appears but one vast trackless wilderness of trees, a dead solemnity, where not even ruins of the numblest kind recall its history to mind, or prove the past dominion of man. All is rude nature as it sprang into existence, still preserving its primeval type, its unreclaimed exuberance. In consequence of the many saline streams which fall into this river, its waters are frequently found to be almost impotable."

* * *

He gives this description of the Grand Prairie:

> "The great prairie of which we have already spoken, said to be 90 miles in length, contains an invaluable body of land, and, where sufficiently drained, which is pretty generally the case, except during the rains of winter, would produce most species of grain in abundance. As a pasture it is truly inexhaustible, though in the hottest months of summer occasionally deprived of water."

* * *

He described the Indians:

> "The aborigines of this territory, now commonly called Arkansas or Ouapaws and Osarks, do not at this time number more than about 200 warriors."

* * *

> "In a council held with the Ouapaws some years ago, concerning the boundaries of the lands which they claimed, a very old chieftain related to the agent, that at a very remote period his nation had descended the Mississippi, and after having proceeded in one body to the entrance of a large and muddy river (the Missouri), they had there divided, one party continuing down the Mississippi, and the other up the miry river. The descending band were checked in their progress by the Kaskaskias, whose opposition they

at length subdued. In their further descent they were harassed by the Chicasaws and Choctaws, and waged war with them for some considerable time, but, at length, overcoming all opposition, they obtained the banks of the Arkansa, where they have remained ever since."

* * *

"The complexion of the Ouapaws, like that of the Choctaws and Creeks, is dark, and destitute of any thing like the cupreous tinge. The symmetry of their features, mostly aquiline, often amounts to beauty, but they are not to be compared in this respect to the Osages, at least those of them which now remain.

Charlevoix says, "The Arkansas (as he calls them) are reckoned to be the tallest and best shaped of all the savages of this continent, and they are called, by way of distinction, the fine men."

* * *

"The name of Akansa or Arkansa, if every generally assumed by the natives of this territory, is now, I am persuaded, scarcely every employed; they generally call themselves O-guah-pa or Osark, from which last epithet, in all probability, has been derived the name of the river and its people; indeed, I have heard old French residents in this country, term it Riviere des Arks or d'Osark."

* * *

He describes the land and possible economy of the Delta:

"Throughout this country there certainly exists extensive bodies of fertile land, and favoured by a comparatievely healthy climate. The cultivation of cotton, rice, maize, wheat, tobacco, indigo, hemp, and wine, together with the finest fruits of moderate climates, without the aid of artificial soils or manures, all sufficiently contiguous to a market, are important inducements to industry and enterprize. "

* * *

"Pasturage at all seasons of the year is so abundant, that some of our domestic animals might become naturalized, as in Paraguay and Mexico; indeed several wild horses were seen and taken in these forests during the preceding year.

The territory watered by the Arkansa is scarcely less fertile than Kentucky, and it owes its luxuriance to the same source of alluvial deposition. Many places will admit of a condensed population. The climate is no less

healthy, and at the same time favourable to productions more valuable and saleable. The privations of an infant settlement are already beginning to disappear, grist and saw-mills, now commenced, only wait for support; and the want of good roads is scarcely felt in a level country meandered by rivers. Those who have large and growing families can always find lucrative employment in a country which produces cotton. The wages of labourers were from 12 to 15 dollars per month and boarding, which could not then be considered as extravagant, while cotton produced form five to six dollars per hundred weight in the seed, and each acre from 1000 to 1500 pounds."

On approaching Little Rock he wrote:

"In the course of the day we passed the sixth Pine Bluff, behind which appeared the first prominent hill that occurs to view on the banks of Arkansa. The fascade or cliffs, in which it terminates on the bank of the river, is called the Little Rock, as it is the first stone which occurs in place. The river, no longer so tediously meandering, here presents a stretch of six miles in extent, proceeding to the west of north-west. In the evening we arrived at Mr. Hogan's, or the settlement of the Little Rock, opposite to which appear the cliffs, formed of a dark greenish coloured, fine-grained, salty, sandstone, mixed with minute scales of mica, forming what geologists commonly term the grauwacke slate, and declining beneath the surface at a dip or angle of not less than 45° from the horizon. The hills appear to be elevated from 150 to 200 feet above the level of the river, and are thinly covered with trees."

* * *

"From this place proceeds the road to St. Louis, on the right, and Mount Prairie settlement, and Natchitoches on Red River, on the left. From all I can learn, it appears pretty evident that these extensive and convenient routes have been opened from time immemorial by the Indians; they were their war and hunting-paths, and such as in many instances had been tracked out instinctively by the bison in their periodical migrations. It is in these routes, conducted by the Indians, that we are to trace the adventurers De Soto and La Salle, and by which we may possibly identify the truth of their relations."

* * *

Just upstream from Little Rock:

"About 2 miles above, commence on the right bank of the river, the first hills, or rather mountains being not less than 4 or 500 feet high, and possessing a dip too considerable to be classed with the secondary formation.

About eight miles from Mr. Curran's, appeared again, on the left, very considerable rount-topped hills, one of them,

called the Mamelle [Pinnacle Mountain] in the distance, where first visible, appeared insultated and conic like a volcano.

After emerging as it were from so vast a tract of alluvial lands, as that through which I had now been travelling for more than three months, it is almost impossible to describe the pleasure which these romantic prospects again afforded me. Who can be insensible to the beauty of the verdant hill and valley, to the sublimity of the clouded mountain, the fearful precipice, or the torrent of the cataract."

Approaching Petit Jean Mountain near Morrilton:

"A storm of wind sprang up during the night from the south-west, and continued so as to retard us, after proceeding with difficulty about six miles in which distance we arrived at the house of Mr. Tucker, situated at the base of a lofty ridge of broken hills, not less than 6 or 700 feet high, presenting an alternation of terraces and cliffs, and continuing in a northwest direction nearly the same height for about eight miles. This range is known by the same name as that of the contiguous rivulet, the Little John, some Frenchmen probably who first discovered it. At the south-east end I found the ascent very steep, and which, like most considerable chains, was at this extremity the highest and most precipitous. From the summit a vast wilderness presented itself covered with trees, and chequered with ranges of mountains, which appeared to augment and converge towards the northwest. To the east a considerable plain stretches out, almost uninterrupted by elevations. From the southwest I could enumerate four distinct chains of mountains, of which the furthest, about 40 miles distant, presented in several places lofty blue peaks, much higher than any of the intermediate and less broken ridges. I thought that this ridge tended somewhat toward the Mamelle, whose summit at this distance was quite distinct, though, at the lowest estimate, 40 miles distant. To the north-east the hills traverse the river, and are in this quarter also of great elevation, affording sources to some of the streams of White river, and to others which empty into the Arkansa. Over the vast plain immediately below me, appeared here and there belts of cypress, conspicuous by their brown tops and horizontal branches; they seem to occupy lagoons and swamps, at some remote period formed by the river."

* * *

"Towards the southern extremity of the ridge which I ascended, there are several enormous masses of rock so nicely balanced as almost to appear the work of art; one of them, like the druidical monuments of England, rocked backwards and forwards on the slightest

touch."

Dardanelle Rock:

"...we were still in the evening five miles below the Dardanelle, having made only about 10 miles from the Galley. We have had the low ridge, which originated this fanciful name, in slight nearly the whole day. On the same side of the river, but more distant, a magnificient empurpled mountain occupied the horizon, apparently not less than 1000 feet high, forming a long ridge or table, and abrupt at its southern extremity. From its peculiar form it had received the name of the Magazine or Barn by the French hunters [he seems to refer to Mt. Nebo instead of the mountain we call Magazine.]

Along either bank the lands are generally elevated and fertile, and pretty thickly scattered with the cabins and farms of the Cherokees, this being the land allotted to them by congress, in exchange for others in the Mississippi Territory, where the principal part of the nation still remain."

He wrote of the Cherokees:

"Both banks of the river, as we proceeded, were lined with the houses and farms of the Cherokees, and though their dress was a mixture of indigenous and European taste, yet in their houses, which are decently furnished, and in their farms, which were well fenced and stocked with cattle, we perceive a happy approach towards civilization. Their numerous families, also, well fed and clothed, argue a propitious progress in their population. Their superior industry, either as hunters or farmers, prove the value of property among them, and they are no longer strangers to avarice, and the distinctions created by wealth, some of them are possessed of property to the amount of many thousands of dollars, have houses handsomely and conveniently furnished, and their tables spread with our dainties and luxuries."

* * *

"Returning from my rambles to-day, chiefly in quest of insects, I picked off my skin and clothes more than 50 ticks (Acarus sanquisugas), which are here more abundant and troublesome than in any other part of American in which I have yet been."

As he approached Ft. Smith:

"Not far from Lee's creek, Perpillon of the French hunters, a low ridge again comes up to the border of the river, in which is discoverable the first calcareous rock on ascending the Arkansa. From hence also the prairies or grassy plains begin to be prevalent, and trees to decrease in number and magnitude. Contiguous to our encampment commenced a prairie of seven miles in length, and continuing within a mile of the garrison. The river, now presenting long and romantic views, was almost exclusively bordered

with groves of cotton-wood..."

While he was on the prairie at Ft. Smith he wrote:

"On th[illegible]th, I again rode out to Cedar prairie accompanied by the Doctor, and one of the soldiers, whose intention was to hunt. Several deer were discovered, but all too shy to be approached. We spent the night about the centre of the first portion of the prairie, which is divided into two parts by the intersection of a small wooded rivulet; and though the evening was mild and delightfully tranquil, the swarms of musquetoes, augmented since the recent freshet, would not permit us to sleep.

It is truly remarkable how greatly the sound of objects, becomes absorbed in these extensive woodless plains. No echo answers the voice; and its tones die away in boundless and enfeebled undulations. Even game will sometimes remain undispersed at the report of the gun. Encamping near a small brook, we were favoured by the usual music of frogs, and among them heard a species which almost exactly imitated the lowing of a calf. Just as night commenced, the cheerless howling of a distant wolf accosted our ears amidst the tranquil solitude, and the whole night we were screnaded with the vociferations of the two species of whip-poor-will. The dawn of a cloudy day, after to us a wakeful night, was ushered in by the melodious chorus of many thousands of birds, agreeably dispersing the solemnity of the ambiguous twilight.

Amongst other objects of nature, my attention was momentarily arrested by the curious appearance of certain conic hillrocks, about three feet high, generally situated in denudated places, and covered over the minute pebbles; these on closer examination proved to be the habitations of swarms of large red ants, who entered and came out by one or two common apertures."

Descending the River again after ascending into Oklahoma, being lost and captured by Indians, he wrote:

"On the 15th we again arrived at the post of Osark, or as it is now not very intelligibly called, Arkansas, a name by far too easily confounded with that of the river, while the name Osark, still assumed by the lower villagers of the Quapaws, and im memory of whom this place was first so called, would have been perfectly intelligible and and original."

* * *

"This morning we observed the newly appointed governor, general Miller, going up to the town from his boat, which appeared to be very handsomely and conveniently fitted up bearing for a name and motto "I'll try," commemorative of an act of courage for which the general had been distinguished by his country."

Major Stephen H. Long was an engineer and explorer who was sent by the Army to explore and map the Louisiana territory to the Rocky Mountains. On his way back in 1820, he visited Ft. Smith, recently built on a site which he had selected in 1817.

There he divided his party into two parts, one of which proceeded directly to Batesville and from there along the Texas-Missouri road to Missouri. The other party went to Hot Springs and from there to Little Rock and Missouri along the Texas-Missouri road.

His journal makes these comments about the land around Ft. Smith:

> "In a region of extensive river alluvion supporting, like that of the Arkansa, boundless forests, impervious to the winds and the rays of the sun, it is not surprising that a state of the atmosphere unfavorable to health should exist. Intermitting, remitting, and continued billious fevers prevail during the summer and autumn; and in many instances terminate fatally. Among recent settlers the want of the most common comforts, of the advice and attendance of skillful physicians, and above all the want of cleanliness, and the destructive habits of intemperance, are causes operating powerfully to produce and aggravate these diseases. The settlements about Fort Smith were sickly, and we saw numbers with that peculiar sallowness of complexion which accompanies those chronic derangements of the functions of the liver so often the consequence of billious fevers. It is obvious that the causes of the acknowledged sickliness of the recent settlements in the south and west are, in a great measure local, and unconnected with the climate. By the increase of settlements, and the progress of cultivation, they will be part removed."

* * *

> "Fort Smith was garrisoned by one company of riflemen, under the command of Major Bradford. Among other important designs contemplated in the establishment of this post, one was to prevent the encroachments of the white settlers upon the lands still held by the Indians. Some of the most fertile portions of the Arkansa territory are those about the Verdigris, Skin Bayou, Illinois, Six Bulls, &c., in which some unauthorised settlements were heretofore made, but have recently been abandoned, in compliance with the requirements of the commandment at Fort Smith."

Comments from the party which traveled eastward along the Arkansas River Valley:

> "The small path we followed, lay, for the most part, through open woods of post oak, blak jack, and hickory, occasionally traversing a narrow prairie. In these open plains, now covered with rank grass and weeds, we discovered here and there some traces, such as a skull or hoof of a bison, indicating that the exclusion possession of man to these regions, had been of a

very recent date."

* * *

"Several trees, which stood near our path, had been in part stripped of their bark, and the naked trunks were marked with rude figures representing horses, men, deer, dogs, &c. These imperfect paintings done with charcoal and sometimes touched with a little vermillion, appeared to be historic records, designed to perpetuate or at least to communicate the account of some exploit in hunting, a journey, or some similar event."

The White River:

"Below the point where it receives the Black river from the north, and even at the Chattahoochee mountains, near one hundred miles above that point, White river is little inferior, either in the width of its channel, or in its volume of water, to the Arkansa under the same meridian.

When we have had occasion to mention among the people of White river, that we had crossed the Arkansa at the Rocky Mountains, more than one thousand miles to the west, the question has been repeatedly put to us, "Where did you cross White river?" Those who have known only the lower portions of both rivers, consider them as nearly of equal length, and as rising near each other, whereas the entire extent of country drained by White river compared to that of the Arkansa is as one to six nearly."

* * *

"There are considerable portions of the upland soil of White river, where the profuse supply of streams and springs of excellent water, the elevation and compartive healthfulness of many situations, and the vicinity of navigable rivers and other local advantages, make amends for the want of exuberant fertility in the soil. The same remark is applicable to the country south of the Arkansa, where the extensive tracts of hilly and rocky soils, which seem admirably adapted to the culture of the vine and the olive. In every part of the Ozark mountains there are vallies, and small portions of land with in the hills, having a deep and fertile soil covered with heavy forests of oak, ash, hickory, and in some places with the sugar maple, and abounding in excellent water. The labor of a few years, will be sufficient to convert these tracts into productive farms, but the inconvenience resulting from the difficulty of communication and access to the different parts of the country, will for a long time retard their settlement."

The journal comments on legends of gold and silver which many people believed:

> "Since the time of De Soto, it has been confidently asserted by many who have written concerning Louisiana, that mines of gold and silver exist in that part of the country of which we are speaking...it is probable the gold and silver mines of the Arkansas territory will recede before the progress of examination, first into the wildest and most inaccessible parts, and at length, disappear entirely. We by no means intend to assert that the region in question will not prove of immense importance on account of its mineral treasurer. Valuable mines of lead and iron are certainly frequent in many parts of it, and we can assign no reason why silver, and other metals should not be found in the argillite with quartzy veins, and in the other rocks of the transition period which are known to exist in these mountains. We only intend to give it as our opinion, that there has as yet been no foundation in actual discovery for the belief that such mines do exist."

Comments on the large streams of the Ozarks:

> "To those who have been long accustomed to the thirsty regions of the Missouri, the Platte, and the upper Arkansa, it is somewhat suprising tomeet in tracts having nearly the same elevation, and resting to a great extent on rocks of a similar character, so great a number of large streams crowded into such narrow compass.
>
> It is not probably that a large portion of the water falling in rains upon the extensive plains at the eastern side of the Rocky Mountains may sink through the loose and porous soil, till at length meeting with some compact stratum, it may be collected into rills, and even considerable streams, which, descending through subterranean channels in the direction of the general inclination of the country, at length meet with the nucleus of the Ozark Mountains, traversing the secondary strata, like a mineral dyke, and are consequently made to appear in the form of large springs. Whether any cause of this kind operates to supply the unusual profusion of water, with which this hilly tract is irrigated, must be for others to decide. The fact is an established one." [There is no such underground river, of course.]

Comments from the party which detoured through Hot Springs:

> "We have been informed, that these remarkable springs were unknown even to the American hunters, until the year 1779. At that time, it is said that there was but one spring discharging heated water."

* * *

> "They are about seventy in number, and rise at the bottom, and along one side of a narrow ravine, separating two considerable hills of clay slate. A small creek enters the ravine from the north by two branches, one from the northwest, and the other from the northeast, flowing after their union, nearly due south, and blending with the water of the springs, increasing rapidly in size, and acquiring so high a temperature, that at the time of our visit the hand could not be borne immersed in it. After traversing from north to south, the narrow valley containing the springs, this creek meanders away to the southeast, and enters the Washita at the distance of eight or ten miles. All the springs are within six hundred yards below the junction of the two brooks, and all except one, on the east side of the creek.
> ...During the winter, the steam which rises from the springs is condensed to a white vapour, which is often visible at a great distance."

G. W. Featherstonhaugh was the second geologist to "explore" and write about Arkansas. During 1835, the last year of the existence of Arkansas Territory, Featherstonhaugh, in a cart pulled by his mule Missouri, and accompanied by his son, traveled the major road from Missouri to Texas. Portions of that road had already been traveled by Schoolcraft and Long. However, Featherstonhaugh's account is the only one which describes its full length diagonally across Arkansas from the Missouri line through Batesville and Little Rock to Texarkana.

He was told this story about the origin of the road:

> "He said that the track by which we had come to his cabin from the main-road, was part of the ancient Indian path or trail from Vincennes on the Wabash to Nachitoches in Mexico, and had been adopted as the general road by white people moving in that direction. This was the reason why so many desperate men from all quarters, Spaniards, Frenchmen, Americans, and other outlaws, had settled near it, and that the greater part of the deserted cabins we had seen had been inhabited by them. There, under the pretence of entertaining travellers, they got them into their cabins, and often murdered them if they had anything to be plundered of."

Near the White River, his narrative describes the immense flocks of Passenger Pigeons:

> "A new and very interesting spectacle now presented itself, in the incredible quanities of wild pigeons that were abroad; flocks of them many miles long came across the country, one flight succeeding to another, obscuring the daylight, and in their swift motion creating a wind, and producing a rushing and startling sound, that cataracts of the first class might be proud of. These flights of wild pigeons constitute one of the most remarkable phenomena of the western country. I remember once, when amongst the Indians, seeing the woods loaded from top to bottom with

> their nests for a great number of miles, the heaviest branches of the trees broken and fallen to the ground, which was stewed with young birds dead and alive, that the Indians in great numbers were picking up to carry away with their horses: many of their dogs were said to be gone mad with feeding upon their putrefied remains."

South of Searcy, where he encountered the Ouachita Mountains, he made these comments:

> "From Walker's, where we got good bread and milk, our horse had a rather distressing road for 14 miles; for the first three miles we had two hills to pass, almost as bad as White River Mountain, and on reaching the top of the second, had a very extensive view of a desert wilderness below us, about 12 miles broad, perfectly flat, and bounded by a lofty ridge running east and west. It was an excessively hot day; in vain we looked for any thing that indicated a settlement--we could see nothing but a dense jungle, which, as we had been told, contained no water, except a few stagnant pools in the dry bayous. This was one of the most striking pictures of wild American scenery I had yet seen; there was nothing to break the comprehensive and uniform character of this woody desert, save an immense conflagration that was raging in the distance, right in the line of our march, covering an immense area of country, and from which rose a tremendous dense column of smoke. This desert, and the general aspect of the land ridges, seemed to portend some change in the geological character of the country.
>
> Into this plain we descended, bent upon getting through it as quickly as we could, for we knew the danger of being enveloped in a conflagration raging in a thick jungle where every thing was dry, and the smoke of which sometimes destroys even animals before they can save themselves. It was painfully hot; we suffered exceedingly from the want of water, and our horse was in such distress, that, seeing a little pool in a low bayou of difficult access, we took him out of the shafts, and cutting a passage, got him down with some difficulty, where he drank, but not eagerly. Despairing of finding any thing better, we determined to try a little of it with some brandy, but the remains of dead lizards, and other disgusting animals, in the putrid mass, made it impossible, and we therefore for the first time took each of us a moutful of brandy alone, which refreshed us very much. We passed through a great number of laurel thickets in this desert, the abode no doubt of many a stout panther; but it being in the heat of the day, we saw none. To emerge from this place we had to ascend another of those sharp ridges, but were amply repaid by the delicious pure air we found at the top. The rocks were now becoming highly inclined, the sandstone was intermixed with narrow seams of quartz was not compact, but consisted of bundles of imperfect crystals, closely wedged in upon each other."

While visiting Little Rock, he made a trip to Pinnacle Mountain which was still called "Maumelle Mountain", as it had been by Nuttall:

"We now entered upon an extensive bottom with numerous streams running through it, one of which, about fifteen miles from Little Rock, is called Petite Mammelle; and here, in the immediate vicinity of this stream, is that magnificient rocky one called the Mammele Mountain, an outlier of the red stone, so often mentioned, of a very precipitous kind. Its south-west aspect is extremely fine, and resembles a pyramid, the height of which is about 700 feet from its base. (Drawing of Pinnacle Mt. under Preface)

Having ridden our horses through the pine-trees which extend two thirds of the way up the mountain, and which was as far as we thought it expedient to take them, we dismounted and secured them in order to accomplish the rest of the ascent, which is naked, steep and rugged on foot. On the S.W. edge of the pyramid, the sandstone beds were lying at an angle of 70° to 75° and in some places they were vertical, being completely set on end. Many acres of the western face were covered with large blocks and fragments of the rock, without a plant or a blade of grass to releive the rugged and desolate aspect it presented. After a fatiguing ascent we gained the top, from whence we saw the river Arkansas at a distance of about two miles, and all the surrounding country at our feet. The rich bottoms were plainly indicated by the decidous trees with which they were covered, and stood in strong contrast to the pine timber growing on the ridges. The horizon was bounded by ridges bearing S.W. and W. from us, and we saw distinctly several high cones to the N.W., which I took to be the elevations called Magazine and Mount Cerne. To the N. was the interminable wilderness of gray leafless forests we had so lately passed over, on our journey to Little Rock. The waving line of the Arkansas, and the extensive bottoms into which it rushes when its channel is full, were all before us. I had no conception before of the great extent of these bottoms, which can never be made available for human purposes until they are protected by levees from the instrusion of the river. The view from this mountain is extremely characteristic of the wilds of America, and would make a fine panorama."

When he was approaching Hot Springs, he saw the effects of a tornado:

"We had proceeded over the sandstone about six miles, always going parallel with the Washita, which flowed about a mile from us--when we came to a part of the country where all the forest trees--without exception--were standing for at least a thousand acres around, dead and bare, with the bark peeled off them, but without any marks whatever of fire having been in the country. This was a phenomenon we were at a loss to account for, but at the next settler's it was explained to us. About six years ago a hurricane passed over the country in the month of May, and desolated every thing it came near. The sky, when passing over this place was frightfully black. * * *

These hurricanes, like those in the West Indies, sometimes

assume a fearful character. I have never been caught in one of the worst of them, but their track in the forest, which I have sometimes fallen in with, presents a singular picture of destruction. I have, come upon an avenue of trees 200 yards wide, torn up by the roots, and going in a straight line through the country for a short distance..."

Crossing the Caddo River near Arkadelphia, he made these comments:

"This place is the site of an ancient village of the Caddo Indians; a large mound with trees growing on it, and other indications of their residence, still exist there; and a sweet sequestered situation it must have been to them, for the river contains good fish, the country abounds in game, and the sandstone, with its pines, is here exchanged for a loose soil of the greatest fertility, and deciduous trees peculiar to these latitudes. On sallying out, after our good cheer, we were exceedingly pleased with the scene around us; the sun was shining brilliantly, flocks of parraquets were wheeling and screaming around, and the trumpet tone of the ivory-billed woodpecker was frequently heard."

He stayed overnight with a Judge Cross near Prescott and made these observations:

"As soon as the dawn appeared-and the first ray of light always awakens me as if some foreign body impinged upon my eyes, I rose and dressed myself, and, being perfectly refreshed with a sweet night's rest, walked out to look at one of the most lovely countries I have ever seen. Everything had become changed since the preceeding day, the sandstone and its constant concomitants the pine-trees had been left behind, and I had now got to a fine gentle undulating country, usually called rolling here, which appeared to consist of a chain of prairies running westward and parallel with Red River for a great distance, until the whole country becomes one vast prairie, devoid of trees, except those which grow immediately upon the water-courses. Some of these prairies were mere bald spots of half an acre and more, whilst others contained several hundred acres, in every instance surrounded with a belt of timber and plants peculiar to the country.

It seemed doubtful from the first superficial examination whether the trees were gradually gaining upon the prairies or those upon the forest. The woods and the copses where Judge Cross had erected his neat cabin were very lovely, and there were from thirty to fity acres of land attached to the house without being disfigured by the coarse stumps of American clearings. I was gratified to find also that the whole soil consisted of the same dark waxy substance I had passed the preceeding day; it was a black as charred wood, and had a much more inky colour than the rich vegetable mould usually found in low grounds...Returning

to the house, I procured a spade and a negro to assist me, and digging in a low part where a stream had worn a channel in the soil, I found reasons to believe that this portion of the country which had the quasi prairie character, was bottomed upon immense beds of rotten limestone, probably derived from the testaceious remains of the mollusca I have named, since entire shells in a soft state are found embedded in the limestone.

At breakfast, having turned the conversation upon the fossils which were in such abundance here, the Judge informed me that his corn-field whence I had taken the shells was part of a natural prairie, one of an immense number that extended to the west; and that he believed, from the personal observations he had made, that the black land of which all these prairies consisted, and which in a rainy time was so waxy that it was difficult to walk or stir in it, was about five miles in breadth, and extended an immense distance.

This exceedingly increased my desire to see more of this southern country in company with the Judge; so after breakfast he very oblingingly mounted his horse, and we made an agreeable excursion in the neighborhood, calling for a short time at the little insignificant wooden village of Washington, where the government land scales were holding."

He commented on the Red River as he crossed near Texarkana:

"On reaching the banks of Red River, although I was very much delighted at having successfully penetrated to this extreme frontier of the broad territory of the United States, yet I could not but perceive that nothing could be less beautiful or picturesque than the river and its shores. The stream was here about 200 yards wide, sluggish, muddy, and chocolate coloured; deriving its colour from the deep red earth it has in ancient times deposited, and through which it now flows; and exhibiting on its banks an impenetrable wilderness of briars, plants of various kinds, and lofty canes of from 20 to 30 feet high. The next thing was to cross the river at what is called Dooley's Ferry, to the Texas side, where, on account of the present low stage of the water, there was an extensive beach of 200 yards or more. As soon as the ferryboat touched the Mexican shore, I hastened to lead my horse over the beach as rapidly as I could, for the ferryman told me that it was very dangerous, would scarcely bear the weight of a horse, and might suck him in, if I loitered. I soon saw this was good advice, for the bog shook in a treacherous manner, and Missouri, who did not appear to like this unusual surface, aiding with great agility, we soon reached the hard land, and four ourselves in what the ferryman called "Spain."

We now were upon an exceedingly fertile bottom between three and four miles wide, densely full of plants and trees, amongst which I recognised for the first time the Palmetto, with its graceful fanlike shape. Having got

through it, we came upon drier and blacker land, and then to a locality called Lost Prairie, which is a tract of about 2000 acres of incredible beauty and fertility, bearing extraordinary crops of cotton, and gracefully surrounded by picturesque woods. I had never seen the cotton plant growing in perfection before, for in the cotton districts I had already passed through, the plant was a low dwarfed bush not exceeding two feet high; but here the whole country was filled with stately and unbrageous bushes five feet high, covered with innumerable pods resembling large white roses."

Frederick Gerstaeker was a German who came to America to enjoy "Wild Sports in the Far West", as he entitled his book. The wild sport he sought was hunting and the far west to him was Arkansas. He spent the years 1839 to 1841 in Arkansas which had already been a state for three or more years. And yet the Arkansas he sought was the wildest part of the state, where "wild sports" still abounded and so the Arkansas in which he spent his time was still very much as it had been to the French or the indians even earlier.

Gerstaeker's Arkansas was a place where buffalo might still be found and where bear-hunts were a common pastime. Even in 1839, such a life could only be found deep in the swamps or the mountains, and his is the narrative of rare experiences.

His travels carried him from Memphis to Batesville to Little Rock, both up and down the Arkansas River by steamboat and canoe, to the headwaters of the Fourche La Fave, Ouachita and White, and through the swamps along the Cache and St. Francis Rivers. (See travels map in Appendix)

While traveling from Memphis to Batesville, he crossed the swamps along the St. Francis River:

"On the 22nd May we were stirring at daybreak; and who would not have been so, after sleeping in the open air in a southern climate, surrounded by mosquitoes, which by the first glimmer of light collect all their forces to attack more ferociously than ever. We roused the ferryman, who told us of an unexpected swamp, which it would be impossible for us to get through with such a weight of baggage. I had heard the word impossible too often, to have much respect of it, it being frequently applied to things that afterwards were proved to be very possible; however a swamp ten miles long did not sound pleasant. We had to beg hard and pay high for a morsel of bread to quiet our appetite, the man declaring that he had nothing else for himself.

Blackfish lake is a desolate, melancholy-looking, coffee-colored piece of water, several miles long, and some hundreds of yards wide, and its gloom is increased by overhanging cypresses. It is said to be full of snakes and other reptiles. Arrived on the opposite side, we had to look out long for the swamp. It was straight before our eyes. In point of fact, the whole land we had passed through was very like a swamp, but hitherto there had been a broad chaussee, running in a direct line through the State of Arkansas, from east to west, from Memphis, in Tennessee, to Batesville; but on the west bank of Blackfish lake it was not yet cut through the

forest, nor raised above the swamp. We were now to enter the reccesses of the primeval forest. And what a forest! And what a journey! A load of from sixty to seventy pounds on our shoulders, soft mud under our feet, the heat of the sun increasing, the swamp giving out a hot suffocating air. Such was our enviable position. We had hardly worked our way for a quarter of a mile through mud and thorns, when we were obligated to sit down and rest; but rest was also a torment; there was not a breath of wind to refresh us, and the moment we stopped millions of mosquitos attacked us. The water was lukewarm, and we had to suck it up from pools covered with slime. If we left the regular path, which was the most muddy, and tried a short cut through the wood, we were caught at every step by the thorns and creepers, which in many places were impentrable. In spite of all, we were not discouraged, but went on as well as we could, floundering and resting alternately. After a time, while taking a short repose, we heard the strokes of an axe - a heavenly sound to our ears."

Later, he had this view from Crowley's Ridge:

"I was much surprised next morning by the view from Dunn's house. We were again amongst the hills, the house standing on the eastern spur, which stretches out towards the swamps like a peninsula. The thick white fog, through which not a tree was visible, north, south, or east, looked like the sea, and I was prompted to look out for a sail; the glowing red ball of the sun as he worked his way through it, cast a roseate hue over all. As the sun rose higher the fog began to disperse, and the tips of the highest trees appeared. As the fog vanished, it gave place to a boundless extent of green, unbroken by any rise, save that on which we stood. I remained for a long time in silent admiration of the facinating sight."

While living along L'Anguille River near Forrest City:

"Then there was all the bustle of arranging and settling and then another attack of ague, which seemed regularly to have fixed itself on me in this unhealthy country. I bore up against it, but was not well enough to mount a horse till the 20th November when I took a ride of four or five miles with my rifle, for a breath of fresh air.

These swamps and morasses partly realize the idea which Europeans entertain of the primitive forest but in which they are frequently deceived, for the simple reason, that on the higher dry ground which are covered with dry leaves and wood, fires are often made, not only by shooting parties, but by the settlers, for the sake of the grass, which comes up all the sooner when all these enormous quanities of leaves, have been burnt; and the fire

does not consume the young plants only, but considerably checke the growth of the older trees, excepting in the marshes, where the ground even in summer is moist; and there the trees grow to a colossal grandeur. I have seen some measuring seven, eight and even nine feet in diameter."

On a solitary Buffalo hunt along Cache River he wrote:

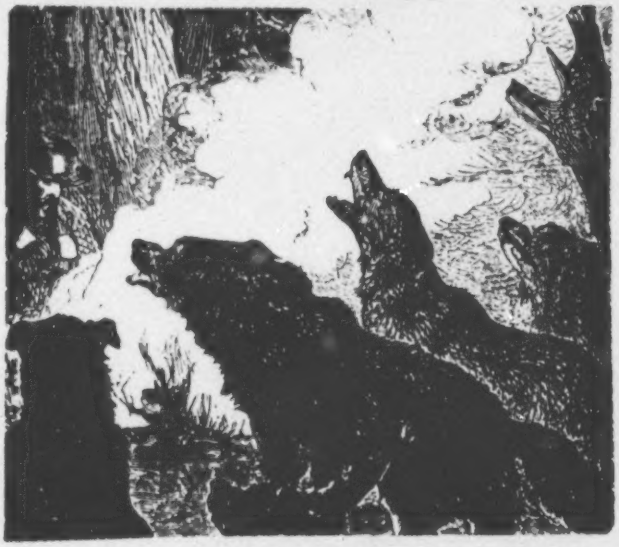
"On, on, without delay, till the evening of the 25th January saw me at Bay de View, a little river running between and parallel to the Cash and I'Anguille. I pitched my camp on one of the many old Indian sepulchral mounds there. Deer and turkeys were plentiful but like the little distiller, the idea of a buffalo hunt had got fixed in my head. So on the 27th I followed the course of the stream, through the wild forest, and at night, beside the crackling fire, gave myself up to troubled thoughts. I had become so used to forest life, that I seldom required the compass; in the level marshy land, with its straight gigantic trees, the traveller can easily find his way by paying attention to the moss, which grows much longer and fuller on the north side than the south.

In a day or two it begun to freeze; as the ground was covered with water, in many places knee deep, the noise I made in breaking the ice drove away all the game within hearing. On the 28th and 29th January, I could not get a shot, and lived on the remains of a turkey and some maize I had in my pockets. On the 30th, I had nothing but the maize, which I roasted and devoured with the greatest appetite; but instead of appeasing my hunger, it only served to excite it the more, and I began seriously to chew tender stems of sassafras, in order to have something in my stomack.

My baggage was no great burden to me. At White River I had exchanged my buffalo skin for a blanket. I had one spare shirt in my game-bag with a pair of rather woful looking socks, a small cord, a bullet mould, and a few bits of lead; but my greatest incumbrance was the zither, which hung over my shoulder. Yet it fully repaid me for all my trouble, when I reposed by the fire after the day's toil, and I never could have prevailed on myself to leave it in the lurch.

Towards evening as, still suffering from raging hunger I was looking out for a dry spot to sleep on, I felt it growing cooler every moment; I made haste to light a good fire and threw myself before it completely exhausted. A hard frost came on, and a little later I was delighted to see it begin to snow. I coiled myself up as well as I could and was soon asleep. I was awakened in the night by the frightful howling of the wolves, which probably had no

better sport than myself, and I consoled myself with the idea that perhaps they were only half as hungry. I got up several times during the night to shake off the snow, and feed the fire with the large logs I had collected the evening before; so that, notwithstanding the severity of the cold, I enjoyed a comfortable warmth.



A bough breaking with the weight of snow, roused me out of my sleep, and when I pulled the blanket from my eyes they were nearly blinded by the bright reflection of the sun's rays from the white surface. The snow suited my purposes very well; I rubbed my hands and face with it, till they were quite a glow, and having no breakfast to cook, I was soon on the march. Though weakened by my long fast, my good night's rest and reawakened hope inspired me with new force, and I lost no time in seeking something to appease my ravenous appetite, as I roamed at random under the heavily laden trees. The evening before, I had discovered, near my sleeping place, an overcup oak bearing sweet acorns, some of which I gathered and devoured, so as not to leave my stomach entirely unemployed. This tree grows to a great size but only in the marshes; the leaves are small, and the acorn is covered by the cup, with the exception of a small opening at the top, whence the name. It is nearly round, and serves for food in case of need, being less bitter than the common sort. Bears are particularly fond of it.

* * *

He had to cross a stream to reach a deer he had shot:

"Had I not been half starved, I should not have thought of venturing into the cold water; but neccesity would admit of no hesitation. I bound together some logs of decayed wood, as floating lightest, laid on the raft my rifle, zither, blanket, hunting-shirt, powder-horn, gamebag, and shirt, and stepped into the icy cold water. I kept on my lower garments, as they were already wet through from the small streams I had waded in the course of the chase. I dipped my head as soon as I could, and then swam across, pushing my raft before me.

Shivering with cold, I had some difficulty in making a fire, on account of the deep snow which covered everything; but I managed it at least with the help of my

tomahawk; dried myself and having laid some steaks on the fire, I devoured them ere they well warmed through.

The exertion of the chase and the cold bath was too much for my weekend frame. I threw myself down by the fire and soon felt another attack of ague. The shivering fit lasted full two hours, and seemed the worst I had experienced: it was succeded by a hot fit, which made me forget ice and snow. Towards evening I was somewhat better, but not in condition to continue my journey; so I cleared away the snow, piled it up like a wall to keep off the wind, collected a good store of wood and slept calmly and sweetly through the night. Next day the ague had left me, but I felt very weak, and remained all day extended before my warm fire, enjoying my venison. Towards evening I took a little turn for the sake of exercise and to see if I could get a shot, returning to my old quarters to sleep, and setting out next day for the long desired buffalo.

* * *

"A few dry strips of land ran across the country from north to south, the intermediate spaces being about a foot or a foot and a half under water, with here and there channels three or four feet deep. Worn out and wrecked as I felt from the frequent attacks of ague, I had twice to swim through the icy water, but the work must carried me through. In fact, I had the choice of that or perishing in the swamp. The first alternative was merely disagreeable, while the latter was highly objectionable; so I chose the former.

I passed the night by a warm fire, at which I roasted a turkey I had shot. It was at any rate an improvement on its predicessor, and my zither responded through the forest to the voices of the owls and wolves."

He made this comment on the common practice of burning the undergrowth of the woods:

"After trying the waters of the Fourche Le Fave, we went to the sources of the Washita; but the forests not having been burnt for many years, were so thickly overgrown with underwood, that it was impossible to find the deer, or to shoot game enough to live upon."

* * *

Traveling from Fourche La Fave to the Ozarks he commented:

"Our road led us near the river, though we seldom saw it, on account of the canes and rushes through which it flows; moreover, we kept to the heights as much as possible, for the sake of dry ground. The main course of the river is from west to east, with very good land on both banks forming excellent winter pasture, while the hills, also running east and west, afford equally good summer pasture amongst the thick pine forests."

* * *

"The hills and rivers south of the Arkansas almost all run, like a river, from west to east, and the hills have a peculiar formation. The middle row or backbone ridge is the highest, and generally on either side are two or three lower ranges of hills, running parallel to the main range, and sloping more and more towards the plain. All the smaller rivers which run into the Arkansas from this side, have such hills between them."

In the Ozarks north of Clarksville he described the land this way:

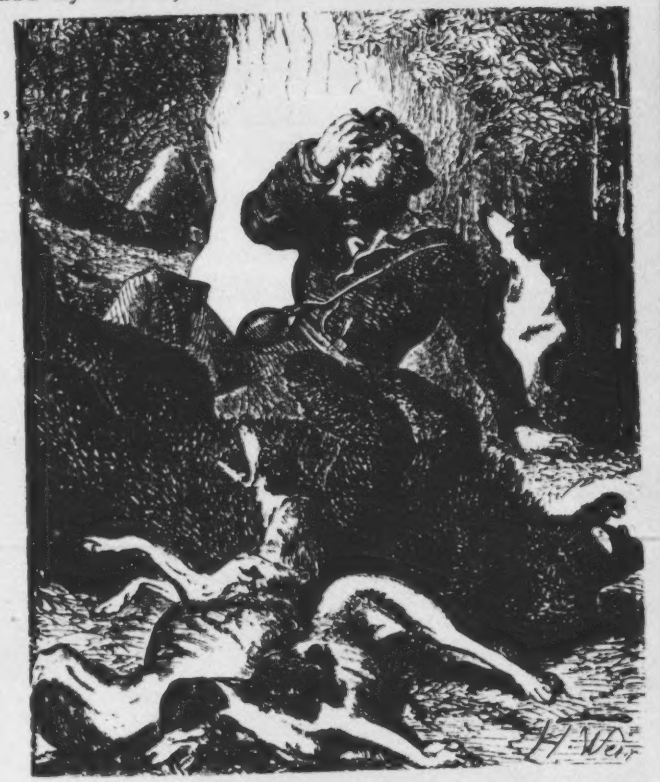
"This day we had crossed the main range of the "Boston divide", which parts the waters of the Mulberry from the White River, and found ourselves on the latter, which here, we could leap across, though further down it is navigated by steamers. The country and vegetation differed considerably from that south of the Arkansas. There was no trace of fir; the mountains were covered with oak, beech, and hickory, all at this season without leaves, which, to an eye accustomed to green hollows, seemed rather mournful and monotonous. It struck me as extraordinary that the best and most fertile land was on the hill tops, where, in other places it is generally the worst; here grew black walnut, wild cherry, with stems sometimes twenty inches in diameter, black locust, and sugar maple, trees which generally grow only in the richest soils. The black locust was very frequent, and its long sharp thorns are by no means pleasant on a journey.

It may have been about two in the afternoon, and we had hitherto seen nothing, when Bearsgrease raised his nose in the air, remained for an instant or two in a fixed position, then giving a short smothered howl, dashed down the mountain side. Listening attentively, we heard the chase coming down the Hurricane river. Erskine called out triumphantly, "We shall have plenty of bear this evening", and dashed after the dog. I was soon by his side. I must observe, by the way, that we were both very hungry. Presently a bear broke through the bushes; a projecting rock stopped him for an instant.

when Erskine saluted him with a ball; he received mine as he rushed past, and disappeared. The dogs, encouraged to greater efforts by our shots and the stronger scent, followed him out, Beargrease, who was quite fresh, leading the van. They soon came up with him, and stopped. We rushed to the spot without waiting to reload, and arrived in time to see the beast, excited to the greatest fury, kill four of our best dogs with as many blows of his paws; but the others only threw themselves on him with the greater animosity, and if our rifles had been loaded we could not have used them. Just as a large powerful brown dog which had feriously attacked the bear was knocked over bleeding and howling, Erskine called out, "Oh, save the dogs," threw down his rifle, and rushed on with his knife among the furious group; I followed on the instant. When the bear saw us coming, he exerted still more force to beat off the dogs, and meet us. Seizing his opportunity, my comrade ran his stell into his side. The bear turned on him like lightning, and seized him; he uttered a shrill piercing shriek. Driven to desperation by the sight, I plunged my knife three times into the monster's body with all my force, without thinking of jumping back; at the third thruse the bear turned upon me. Seeing his paw coming, I attempted to evade the blow, felt a sharp pang, and sunk senseless to the ground.

When I recovered my senses, Beargrease was licking the blood from my face. On attempting to rise, I felt a severe pain in my left side, and was unable to move my left arm. On making a fresh effort to rise, I succeeded in sitting up. The bear was close to me, and less than three feet from him lay Erskine, stiff and cold.

The sun had gone down, and I had hoped that the other hunters might have heard our shots and the barking and howling of the dogs. It grew dark. No one came."



* * *

"Such an awakening as I had was worse that I could wish to my betterest enemy. Beargrease had pressed close to my side, laying his head on my breat; the fire was almost out, I was shivering with cold, and the wolves were howling fearfully around the dead, keeping at a distance for fear of the living, but no means disposed to lose their prey. I rose with difficulty, and laid more wood on the fire. As it burnt up, the face of the corpse seemed to brighten. I started, but

found it was only an optical delusion. Louder and fiercer howled the wolves, and the dogs, of whom five were alive besides Beargrease, answered them; but the answer was by no means one of defiance--rather a lament for the dead. Partly to scare away the wolves, partly in the hope of finding help, I loaded and fired three times; my delight was inexpressible as I heard three shots in return."

* * *

"Joy upon joy, I heard a human stranger, and Wachiga advanced out of the bush. "Wah", he exclaimed, starting at the shocking spectable. He felt poor Erskine, and shook his head mournfully. He then turned to me. I showed him my swollen arm, which he examined attentively, without speaking. Forming a hollow with his two hands, and placing them to his lips, he gave a loud piercing shout. The answer came from no great distance, and in a few minutes my dear old Conwell, and almost of the Indians, were at my side. I gasped Conwell's hand sorrowfully, and told him in a few words how it had all happened. The old man scolded, and said it served us right; there was no great danger in sticking a knife into a bear's paunch, when he is falling, with the dogs upon him, but if he has been thrown, and then catches sight of his greatest enemy, man he exerts all his force to attack him, and woe to him who comes within reach of his paws. It was all very well talking; he had not been present, and seen one dog after another knocked over never to rise again; five minutes more, and not one would have been saved, and who knows whether the enraged beast would not have attacked us, then."

* * *

A SUMMARY

This, then, is a glimpse of the land, life and people of early Arkansas seen through the eyes and words of some travelers and a description of the geography of the state from a new viewpoint. This viewpoint concentrates on the environmental systems of the state - how they formed, how they have changed, and how people related to them.

This volume concentrates on the early history of the state - the effects of the ancient oceans, geological forces and climate on formation of our land, and its changes through time. All of these then affected the ancient people and first settlers.

The Arkansas that ancient people first found was a place which provided them with food and shelter. As the climate and habitat changed, the number of Indians in the habitats changed and they adapted their way of life to the new conditions. Sometimes they adapted the habitat to their own needs, such as by maintaining prairie openings with fire or making openings in the woods for gardens. The environment of the uplands made necessary an independent, wandering existence which allowed no surpluses or comforts. The lowlands were well suited to cultivation, but malaria (ague) was common.

The patterns of life begun by the Indians in Arkansas were followed closely by the early settlers and travelers. The people of the lowlands farmed and the people of the uplands lived scattered across the land, spending much of their time hunting.

The rest of this series will show that these patterns which were established early continued even to the present, and we will see how they affected the early settlements, availability of natural resources, economy, culture, and land use.

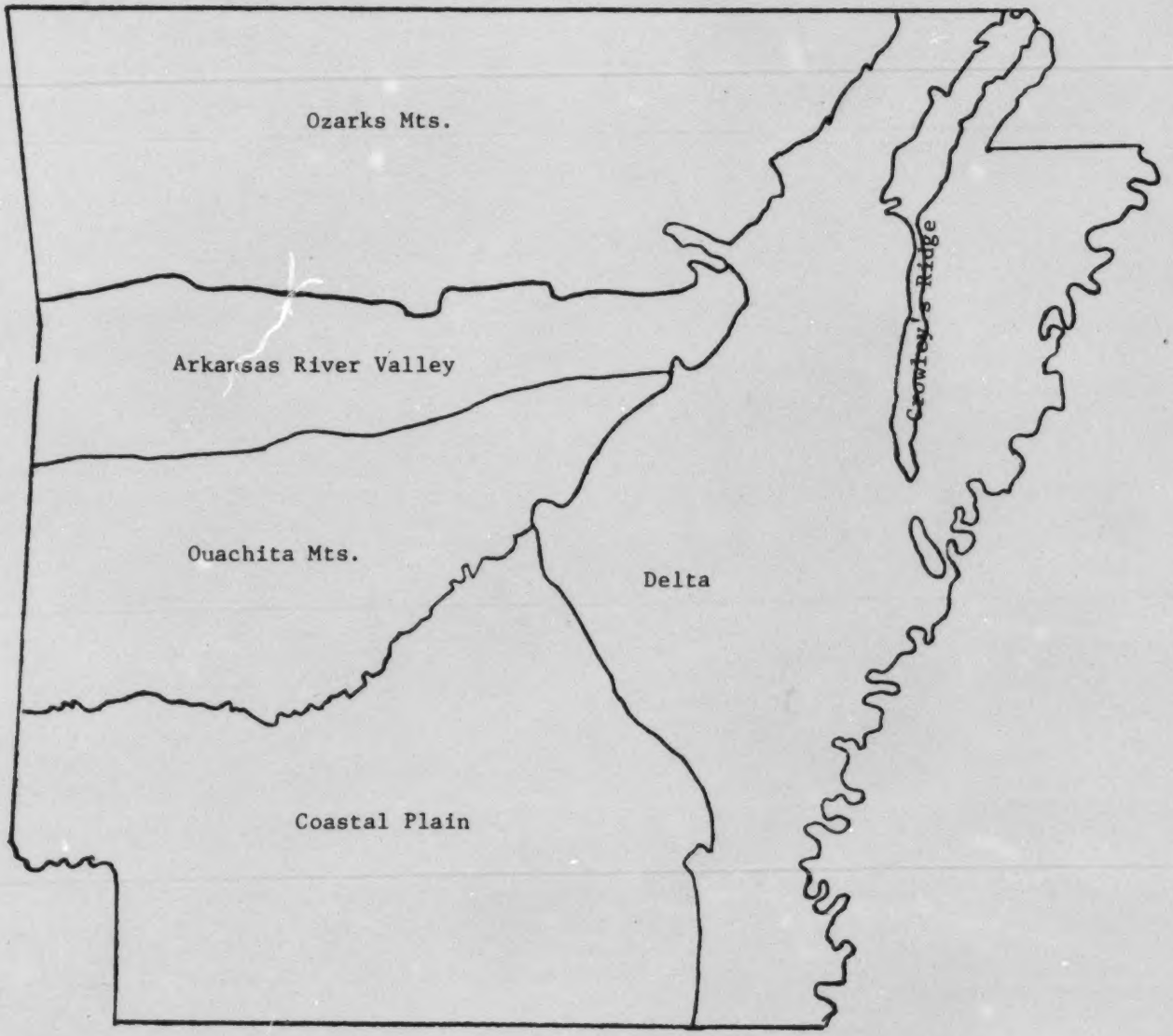
APPENDIX

SOME NEW WORDS

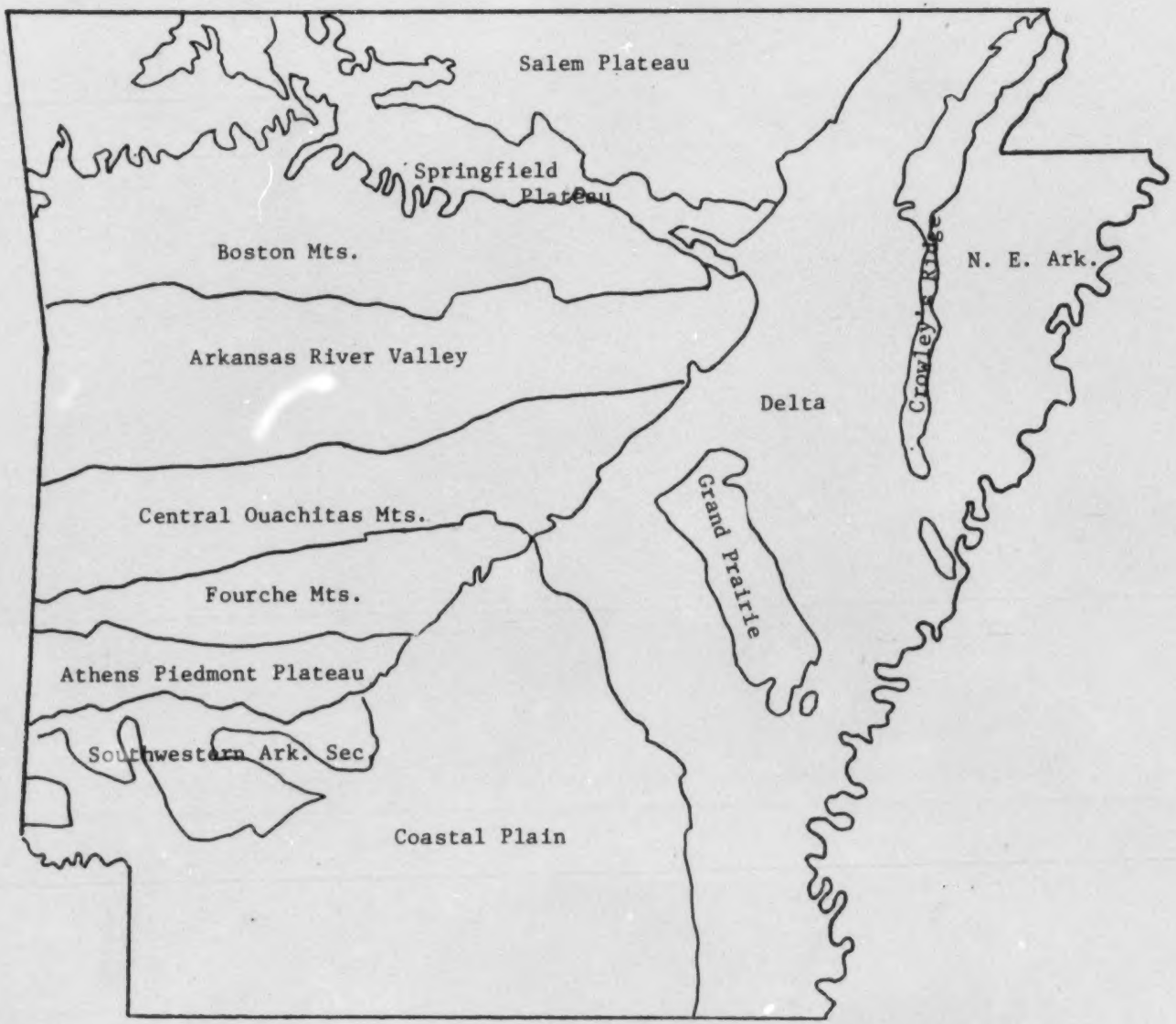
alluvial - composed of material deposited by rivers and lakes.
bituminous - containing asphalt
brachiopod - a marine animal similar to a clam.
cataract - a waterfall
chert - a flintlike rock
cnesta - a ridge of land with one steep side, and a more gentle slope on the other side.
dolomite - a rock similar to limestone or marble, but with more magnesium.
embayment - having the shape of a bay.
escarpment - a long, high steep face of rock.
geologic time - the time during which rocks, mountains, and other geologic features have been created; often measured by the life-forms (fossils) which were present at the time of the event; divided into eras and periods of eras.
lignite - a form of coal in which the plant material has not completely transformed to coal; has low heat value, but may be an important future source of energy.
maize - corn
mammoth and mastodon - extinct elephant-like animal.
mesa - a flat-topped hill with steeply sloping sides.
novaculite - a very hard rock known as "Ouachita stone" or "Arkansas stone" which is used for very fine whetstones.
piedmont plateau - a plateau lying at the base of mountains.
plateau - an elevated tract of land.
rune - a viking letter or symbol.
saline - salty
scarp - steep slope
synclinorium - a series of mountains whose rock layers tend to dip toward the center of the system; in an anticlinorium, the rock layers of the series of mountains tend to rise toward the center.
topography - the shape of land features.
warping - bending of rocks over geologic time.

BEST COPY AVAILABLE

The Natural Divisions of Arkansas

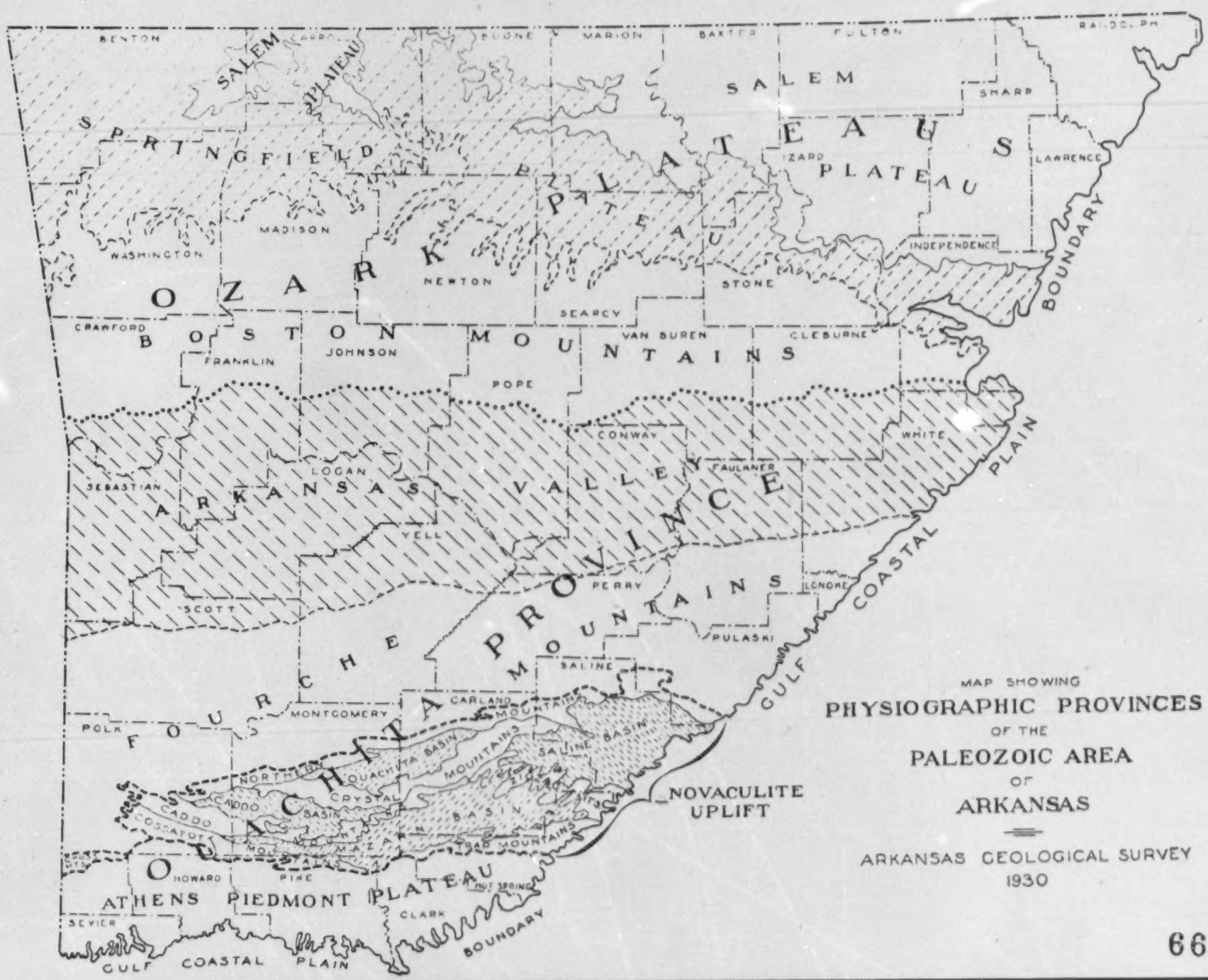


Divisions, Subdivisions, Sections



A SUMMARY OF THE GEOLOGICAL HISTORY OF ARKANSAS

PERIOD (million years before present)	OUACHITA MOUNTAINS	OZARK MOUNTAINS	COASTAL PLAIN	DELTA
Pre-Cambrian (3000)		St. Francois Mountains (Missouri) formed and reduced to knobs but never leveled or covered by the sea.		
Paleozoic (600) Cambrian (600)	Covered by the sea			
	30,000 feet of sediments deposited by the erosion of Llanoria, a landmass to the south.	(Arkansas Portion)		
Mississippian (345)	Llanoria sinks and a bed of sediments up to 120 miles wide is folded to half its width as the Ouachita Mountains.			
Pennsylvanian (310)	At least 18,000 ft. of sediments is stripped from the Ouachitas, but they are never completely leveled.			
Permian (280)	Erosion continues	Ozarks uplifted as a dome 3-4000 feet high with its focal point at the St. Francois Mountains during the Appalachian Revolution, base-leveled several times and raised again.		
Mesozoic (230)		Base-leveled and partly inundated several times.		
Cretaceous (135)			Southwestern Arkansas is exposed permanently. The remainder of the Gulf Coastal Plain is alternately covered by the sea and exposed.	The upper Mississippi embayment is a topographical feature (a depression) early in the Cretaceous but disappears later.
Cenozoic Tertiary (63)	Uplift, as much as 1200-1500 feet near Rich Mtn. Drainage radiating from the center of this uplift was probably established at this time.	Uplift of 500 feet in the Boston Mountains, associated with the contemporary uplift in the Ouachitas.		
	The Hot Springs peneplain formed by erosion; it now exists at the base of Rich Mountain, the divides of the Athens Plateau, and the crests of the cuestas and uplands of the Arkansas River Valley.		Surface leveled late in Tertiary; existing remnants are covered with gravel which is often called the Lafayette Formation and may have been deposited near this time.	
	Uplift raises these surfaces, up to 300 ft. near the White River.			
	Large valleys formed by erosion.			
(Pliocene)	Possible slight uplift			
Quaternary (1) (Pleistocene)	Gorge-cutting because of uplift or because of increased rainfall.	Springfield and Salem Plateaus completed by uplift and erosion.	Trenching by Red River. Tertiary surface is largely removed except for a high terrace of "upland flats" 20 miles wide along the Red River.	The Mississippi River cuts 100-200 feet deeper than at present because of the uplift. The former surface of the Delta is planed away except for Crowley's Ridge. Floodplains are subjected to periods of dessication. From dust gathered from floodplains by winds, Crowley's Ridge is completed.
			Port Hudson Submergence	
			Alternate filling and cutting because of indirect effect of northern glaciation.	
(Recent)		Valleys on the eastern side of the Ozarks fill.		Aggradation and valley filling.



MAP SHOWING

PHYSIOGRAPHIC PROVINCES OF THE PALEOZOIC AREA OF ARKANSAS

ARKANSAS GEOLOGICAL SURVEY
1930

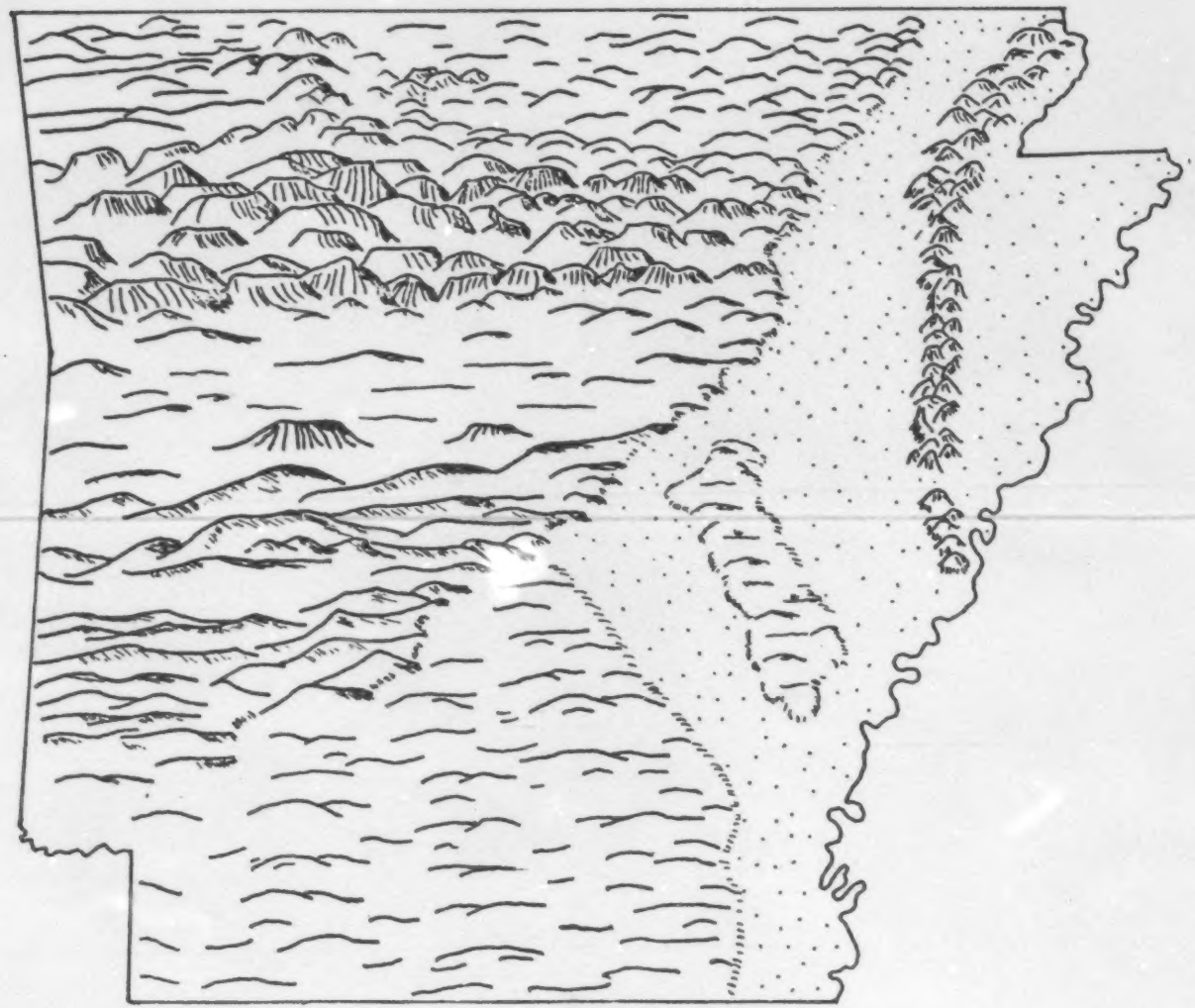
GENERAL GEOLOGIC MAP
STATE OF ARKANSAS

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
LITTLE ROCK, ARKANSAS

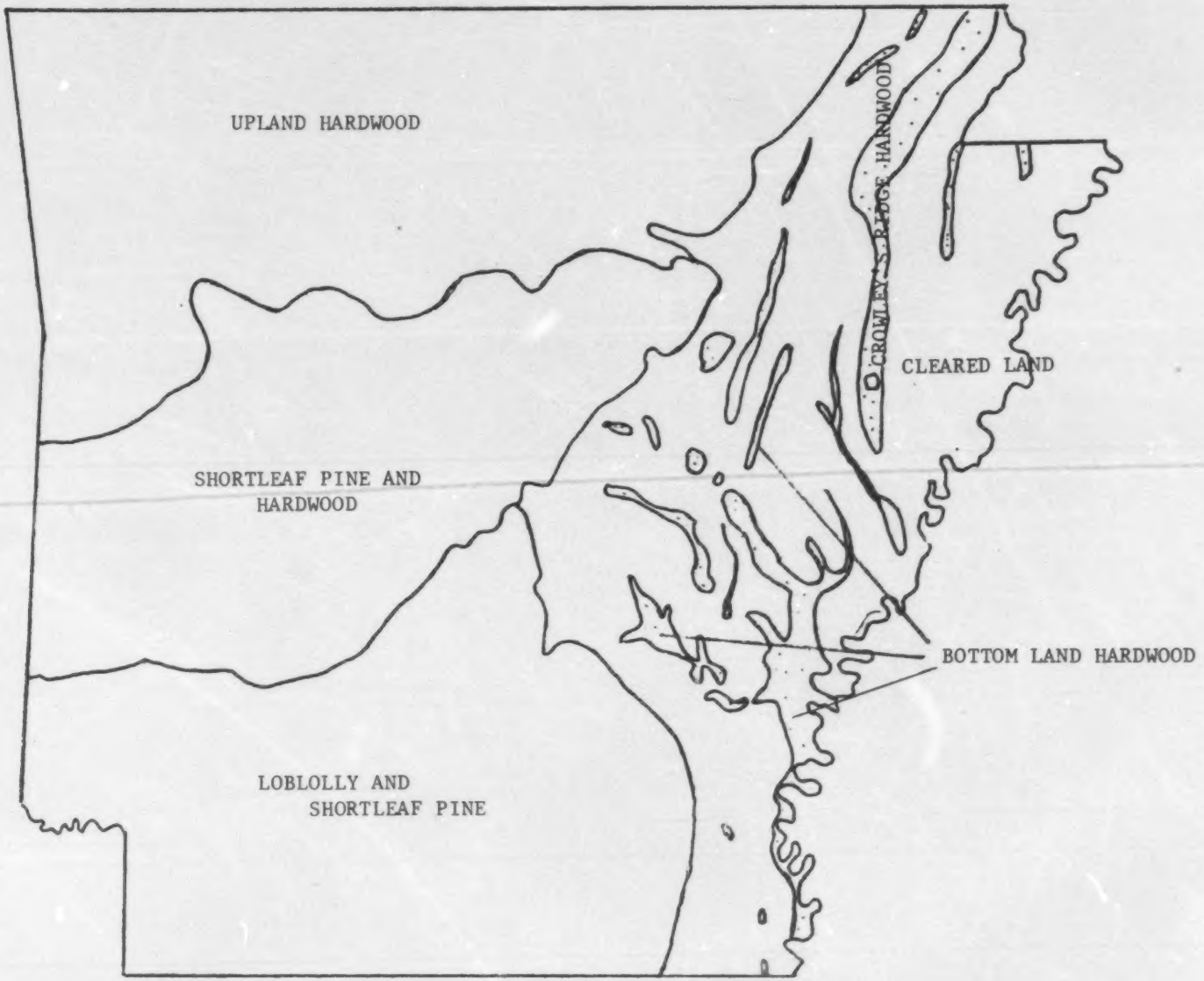
9/25/57 6-L-11,864

1.	Boone Formation, Chert	Mississippian	
2.	Pitkin Limestone, Fayetteville Shale, Batesville Sandstone, Bloyd Shale and Hale Formation	Mississippian	
3.	Cotter Dolomite	Ordovician	
4.	St. Peter Sandstone and Calico Rock Sandstone Member of Everton Limestone	Ordovician	
5.	Atoka Formation Shale and Sandstone	Pennsylvanian	
6.	Hartshorne Sandstone, Spadra Shale, Fort Smith Sandstone and Sandy Shale Paris Shale	Pennsylvanian	
7.	Jackfork Sandstone, Stanley Shale and Hot Springs Sandstone, Polk Creek Shale and Bigfork Chert, Womble Shale, Blakely Sandstone and Mazarn Shale	Mississippian, Silurian, and Ordovician	
8.	Woodbine and Tokio Formation Brownstown Marl, Arkadelphia Marl and Nacatoch Sand	Upper Cretaceous	
9.	Claiborne Formation and Wilcox Formation - Sand, Clay, Quartzite and Lignite	Eocene	
10.	Loess	Pleistocene	
11.	Jackson Formation	Eocene	
12.	Alluvium and Terrace Deposits	Pleistocene & Recent	

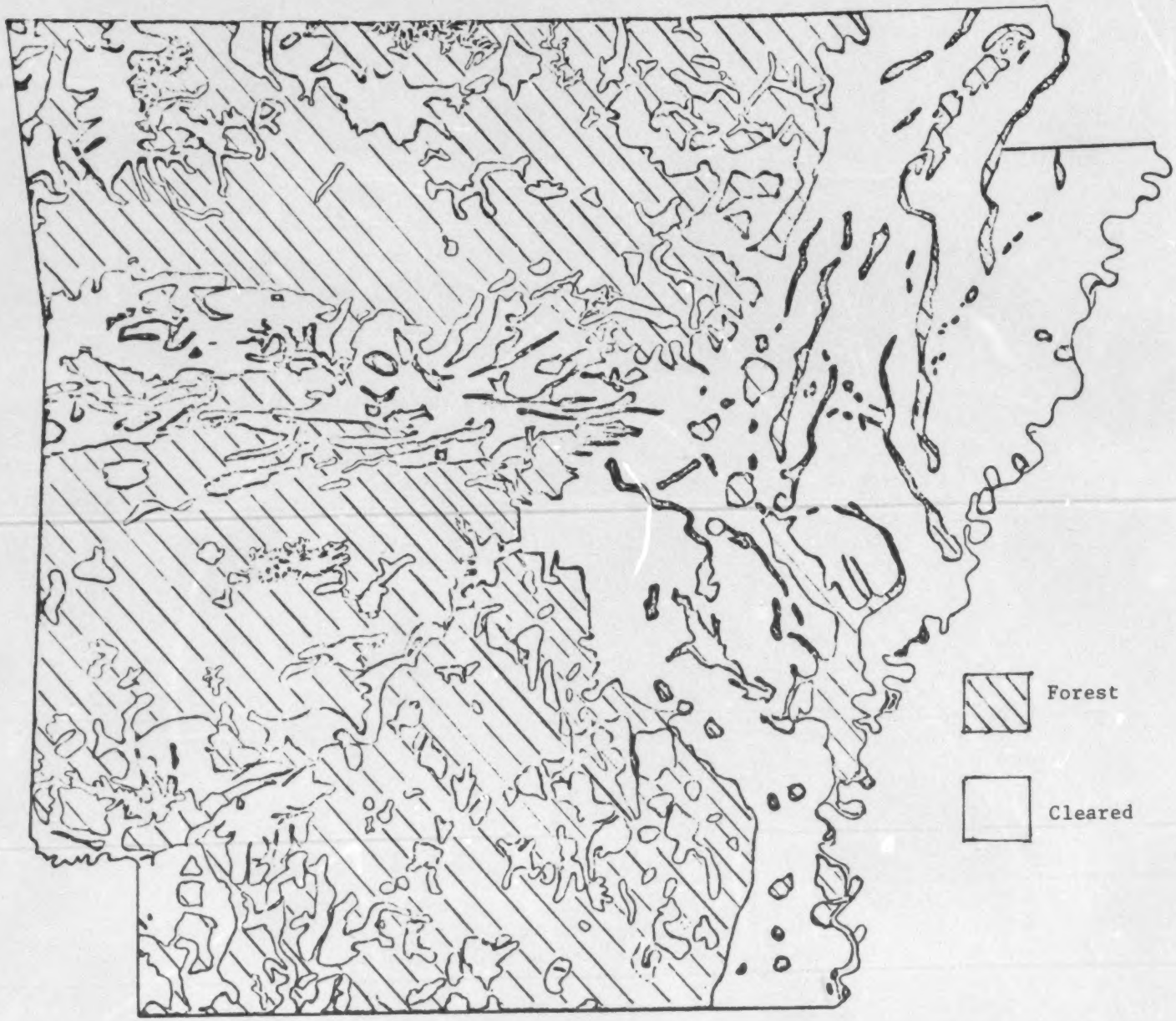
Topography

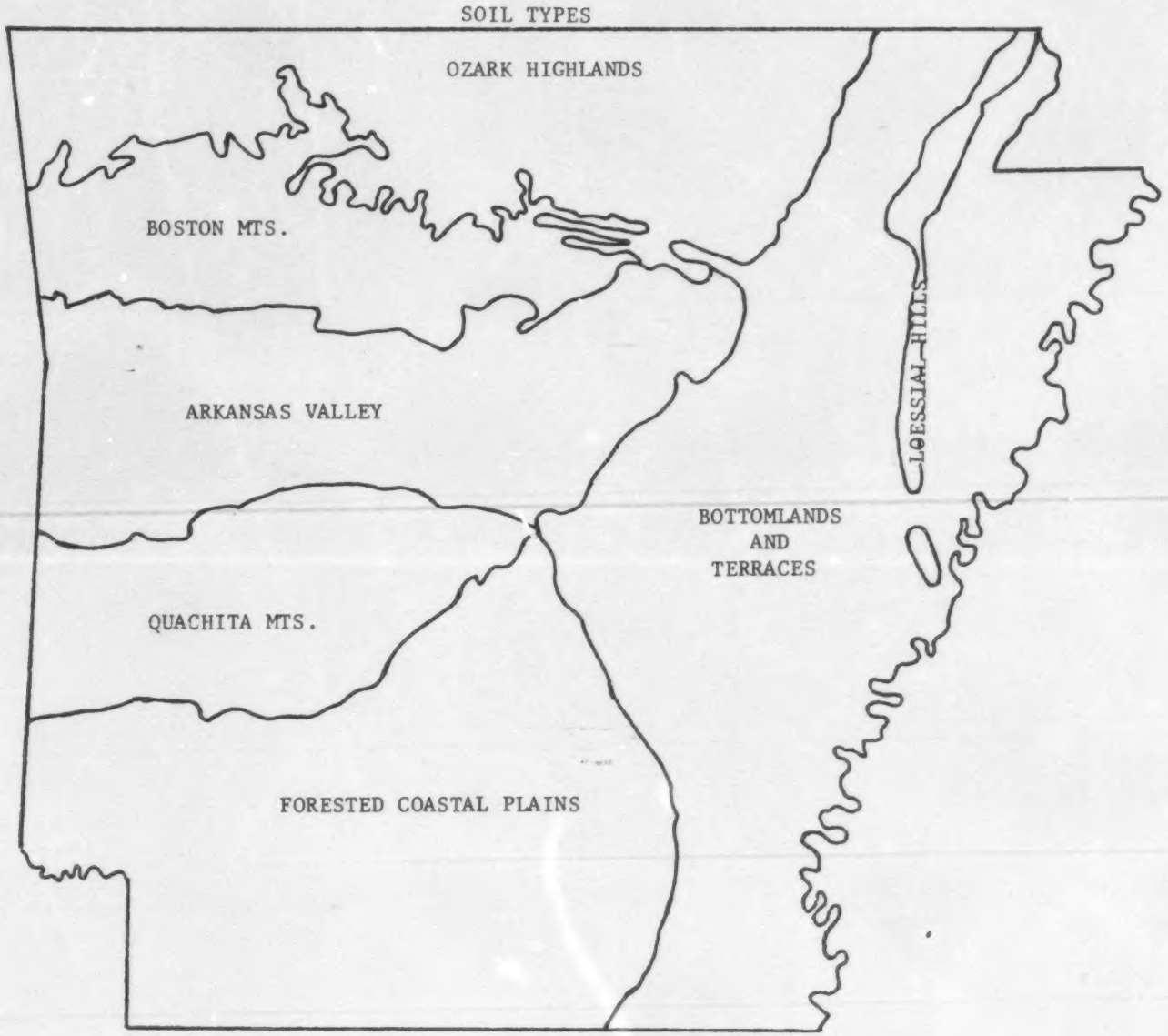


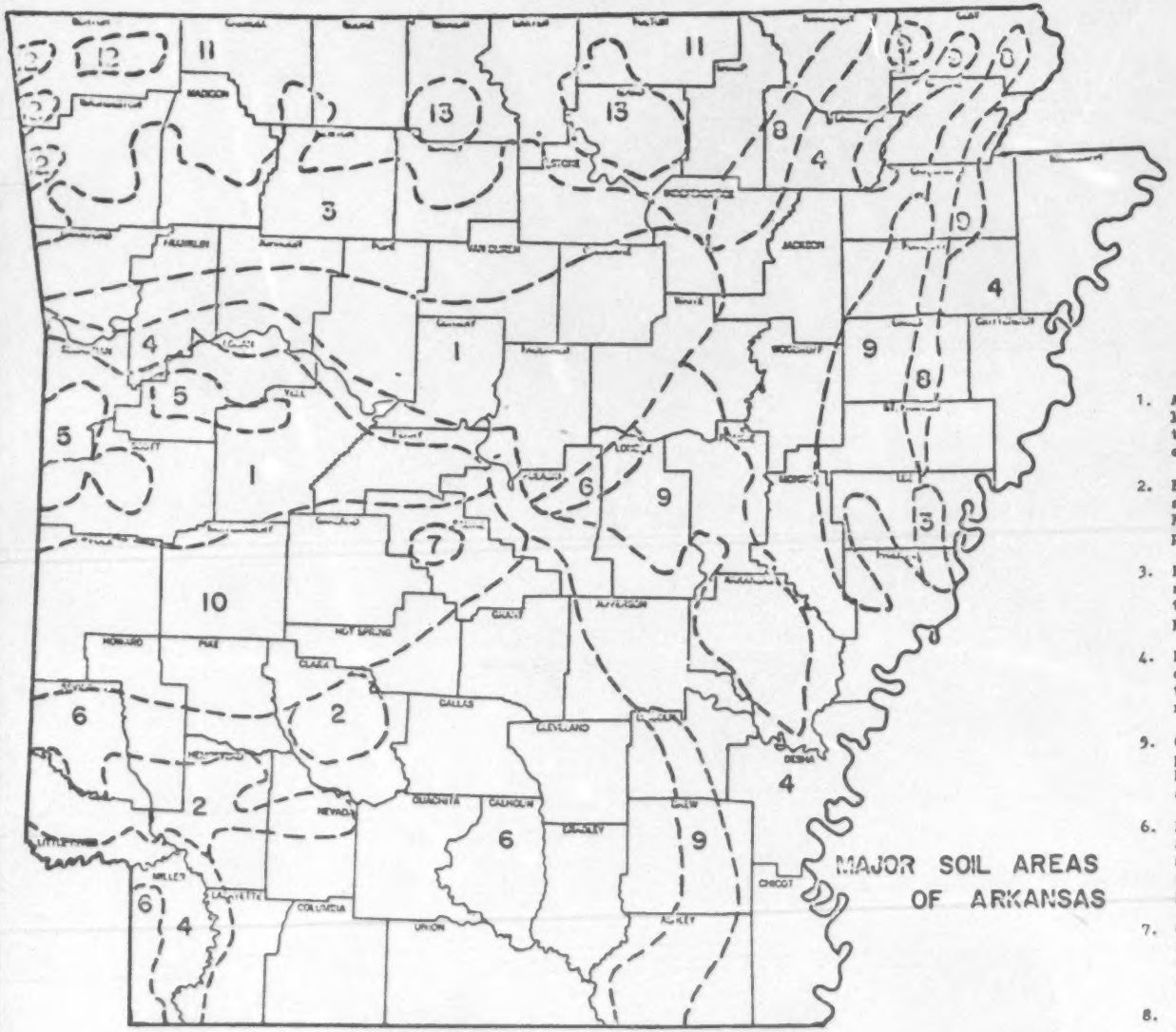
FOREST TYPES



Forest Cover



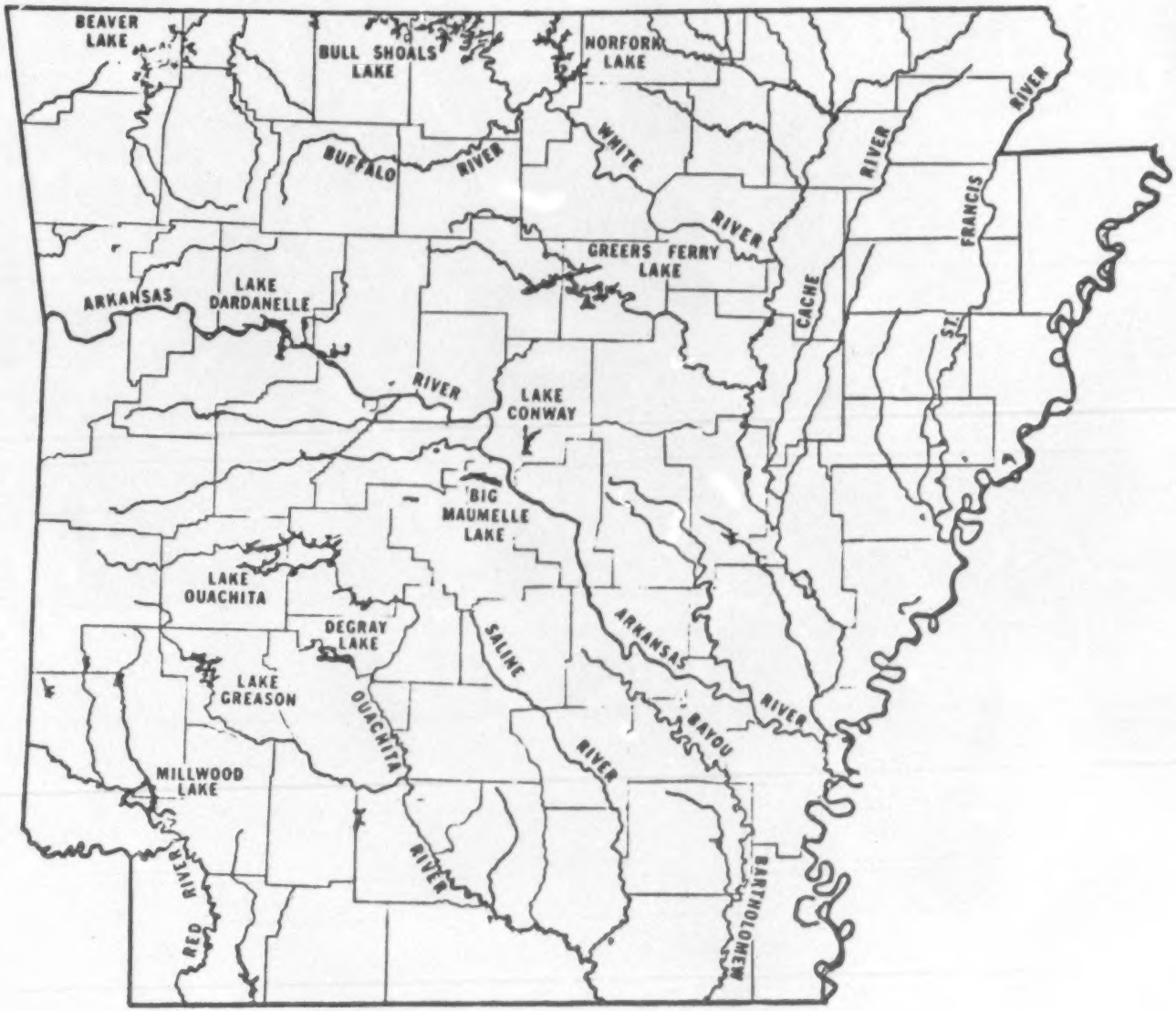

SOIL TYPES
OZARK HIGHLANDS
BOSTON MTS.
ARKANSAS VALLEY
LOESSIAL HILLS
BOTTOMLANDS
AND
TERRACES
QUACHITA MTS.
FORESTED COASTAL PLAINS



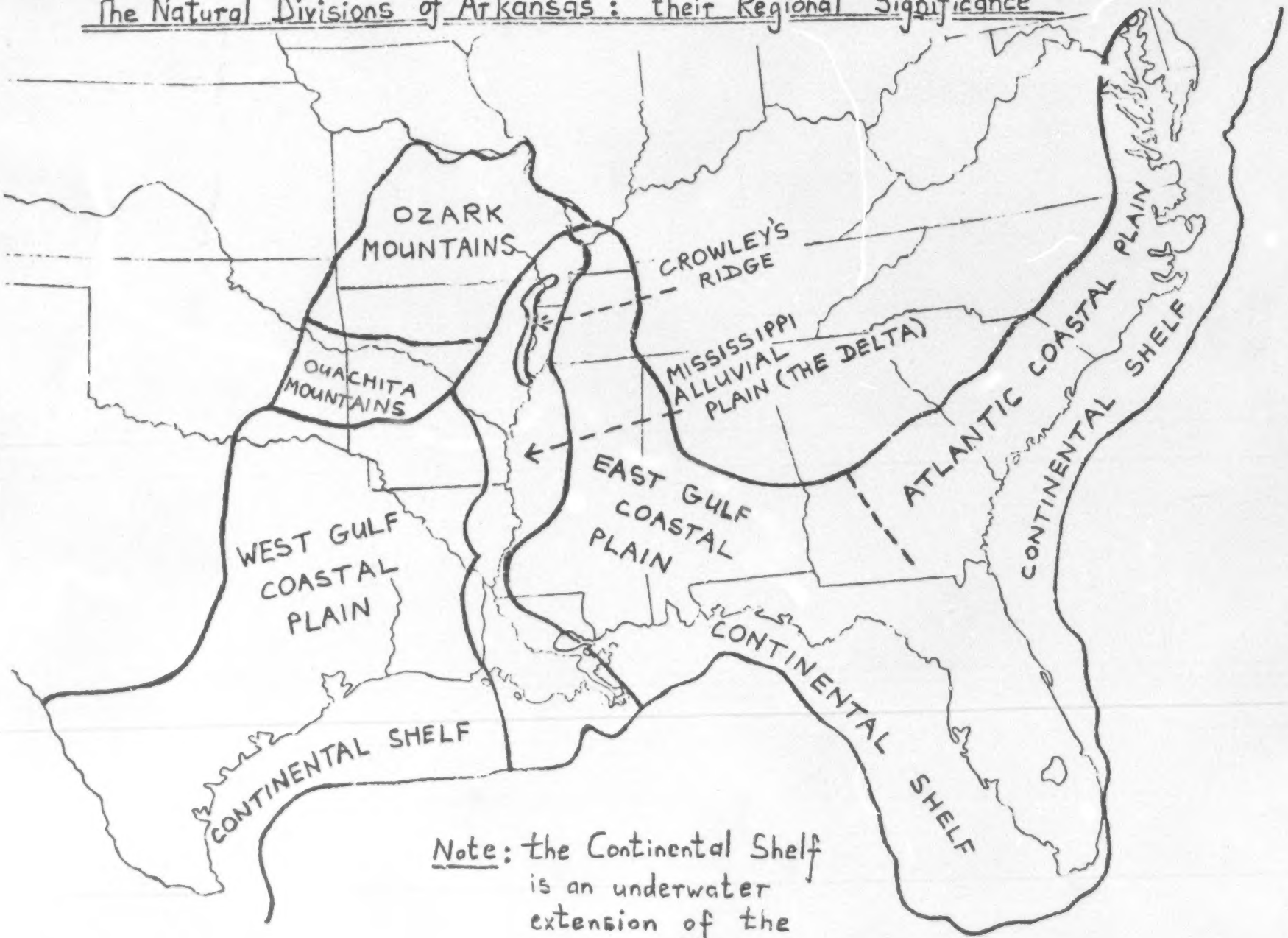
MAJOR SOIL AREAS LEGEND

1. Arkansas Valley. Sandy loam soils. Medium textured, Slowly to moderately permeable.
2. Blackland Prairies. Clay soil and rolling land. Fine textured. Slowly permeable.
3. Boston Mountains. Sandy stony soils. Medium textured. Slowly to moderately permeable.
4. Bottomlands. Sand, silt and clay soils. Coarse to fine textured. Very slowly to rapidly permeable.
5. Cherokee Prairies. Clay pan soils, shale valleys. Medium textured. Very slowly permeable.
6. Forested Coastal Plain. Sandy soils. Coarse to medium textured. Very slowly to rapidly permeable.
7. Granitic Soils. Silt loam soils. Medium textured. Slowly to moderately permeable.
8. Loessial Hills. Deep silt loam soils. Medium textured. Slowly to very slowly permeable.
9. Loessial Terraces. Silt loam soils. Medium textured. Slowly to very slowly permeable.
10. Ouachita Mountains. Gravelly silt loam and sandy loam soils. Medium textured. Moderately to slowly permeable.
11. Ozark Highlands, Chert and limestone. Cherty silt loam and silt loam soils. Medium textured. Rapidly permeable.
12. Ozark Highlands. Prairie. Silt loam soils. Medium textured. Slowly to moderately permeable.
13. Ozark Highlands. Sandstone, limestone, and shale. Sandy loam to clay soils. Coarse to medium textured. Moderately to rapidly permeable.

Rivers


BEAVER LAKE
BULL SHOALS LAKE
NORFORK LAKE
WHITE RIVER
BUFFALO RIVER
GREERS FERRY LAKE
ARKANSAS RIVER
LAKE DARDANELLE
LAKE CONWAY
BIG MAUMELLE LAKE
LAKE OUACHITA
DEGRAY LAKE
LAKE GREASON
OUACHITA RIVER
SALINE RIVER
ARKANSAS RIVER
BAYOU BARTHOLOMEW
MILLWOOD LAKE
RED RIVER
CACHE RIVER
ST. FRANCIS RIVER

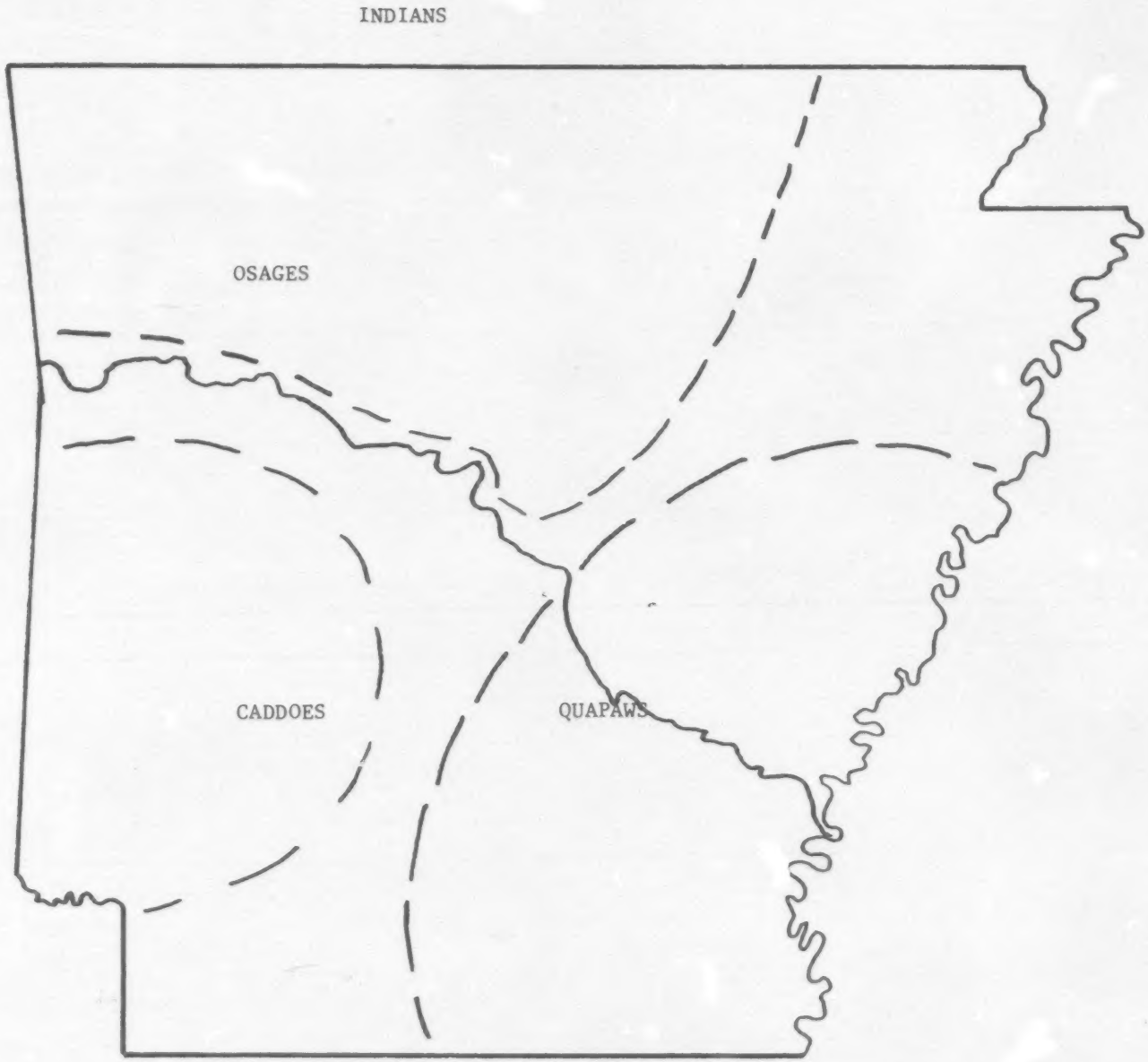
The Natural Divisions of Arkansas: their Regional Significance



Note: the Continental Shelf is an underwater extension of the Coastal Plain.

81

82


INDIANS
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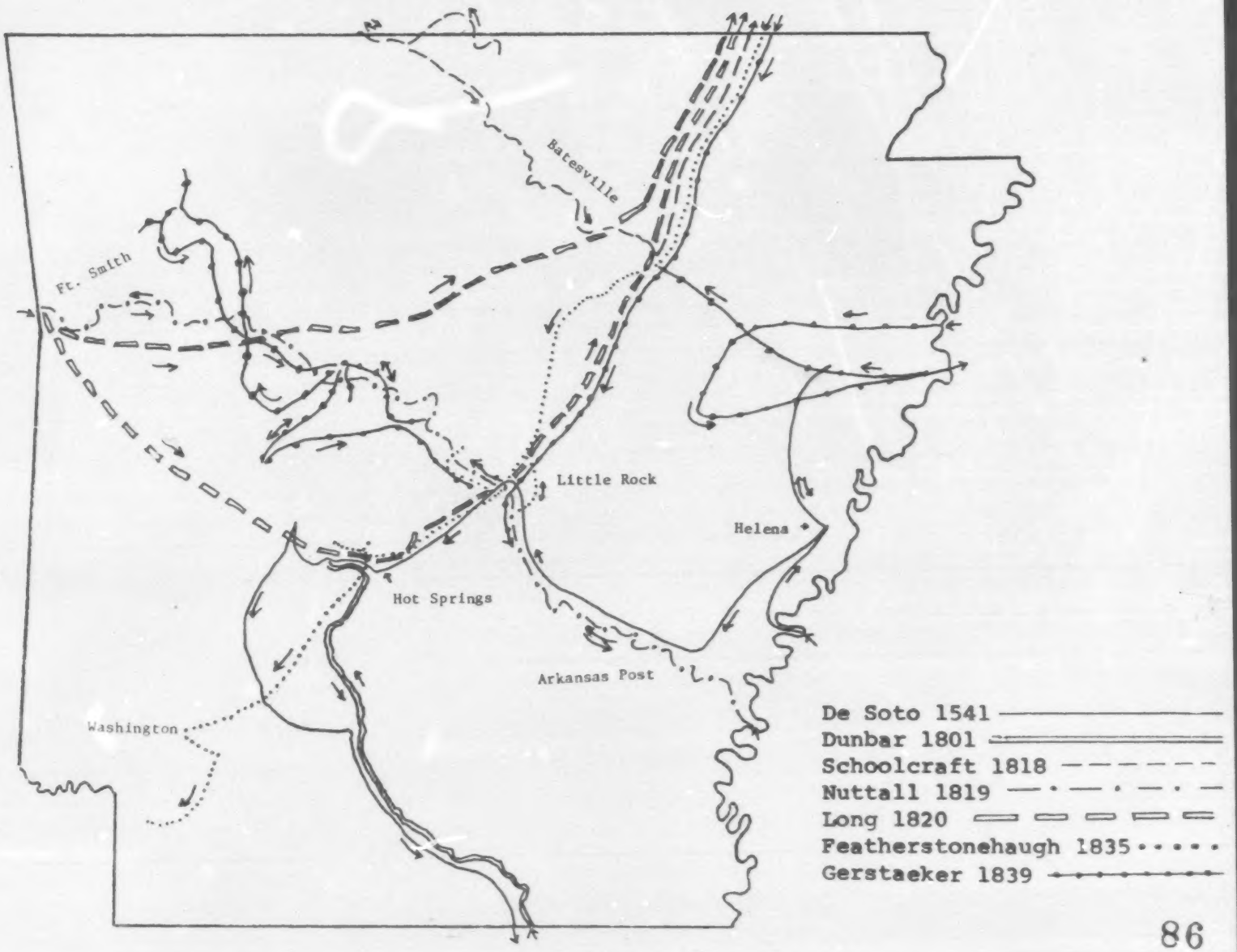
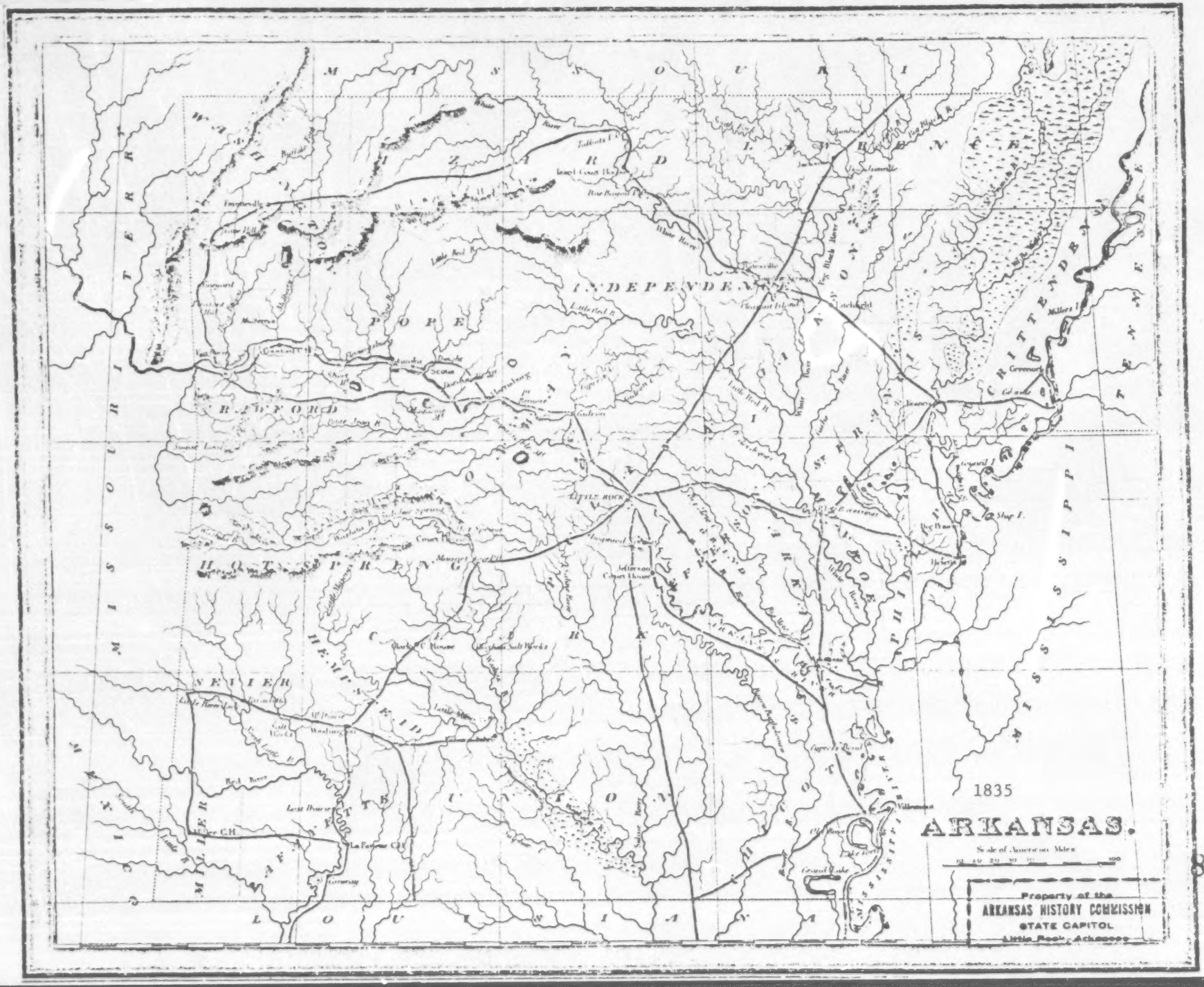
QUAPAWS

Early Arkansas Travelers




1835
ARKANSAS.
Property of the
ARKANSAS HISTORY COMMISSION
STATE CAPITOL
Little Rock, Arkansas

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